INSTITUTE OF DEVELOPMENT STUDIES

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The political ecology of soybean farming systems in Mato Grosso, Brazil

A cross-scale analysis of farming styles in Querência-MT

Mateo Mier y Terán Giménez Cacho

Thesis submitted for the degree of
Doctor of Philosophy in Development Studies

January 2014

I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

Signature:… ……

Mateo Mier y Terán Giménez Cacho

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Supervisors:
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Summary

Over the past two decades the expansion of soybean production in Brazil has been assessed and used as an example of the success or failure of large-scale, mechanized agricultural production. Indeed, the economic, social and environmental implications of this agricultural expansion are highly contested. Nevertheless, the complexity behind this process is rarely depicted. Instead simplistic and monolithic notions of *agronegocio* (agribusiness), and linear interpretations of soybean expansion are offered. These general accounts reduce agrarian dynamics, diversity of farming styles and differences in livelihoods to a homogenous phenomenon in all soybean production regions in Brazil. This limits the scope to understand processes of socio-technical, socio-economic and socio-environmental transformations and the existence of diverse pathways related to the soybean agri-food systems.

This study therefore rejects the simple narratives, and argues for a more nuanced understanding of the diverse processes and dynamics between soybean farming styles and its actors' interactions as part of fast-changing agri-food systems. This is done through a case study approach in the municipality of Querência in the state Mato Grosso, Brazil. An examination of narratives (the ways different people talk about and construct farming and its objectives) and practices (the different farming styles and livelihood strategies) informs this analysis. In particular, the research explores how a heterogeneity of soybean farming styles – contrasting large-scale, medium-scale and smallholder soybean farmers – is constructed in a particular place, offering in turn a more nuanced account of the standard, highly polarised assessment of farming styles and their implications. It then contributes to an understanding of how policies and practices related to diverse soybean agri-food systems in Mato Grosso state are played out. This sheds light on how notions of rural development are constructed and how pathways to sustainable development are seen.

A ecologia política dos sistemas agroalimentares da soja em Mato Grosso. Análises por escala dos estilos de agricultura em Querência-MT.

Nas últimas duas décadas a expansão da produção de soja no Brasil tem sido avaliada e usada como exemplo tanto do sucesso como do fracasso da produção agrícola mecanizada em grande escala. De fato, os benefícios e consequências econômicas, sociais e ambientais dessa expansão agrícola são altamente contestados. No entanto, a complexidade subjacente a esse processo é raramente retratada. Ao invés disso, são comunmente apresentadas noções simplistas e monolíticas do que em Brasil é communmente chamado de agronegócio, além de interpretações lineares da expansão da soja. As visões gerais reduzem as dinâmicas agrárias, a diversidade de estilos de agricultura (farming styles) e as diferenças em modos de vida (livelihoods) a um fenômeno homogêneo em todas as regiões de produção de soja no Brasil. Isso limita a capacidade de compreender os processos de transformações sociotécnicas, socioeconômicas e socioambientais, assim como a existência de diversos caminhos relacionados com os sistemas agroalimetares da soja.

Este estudo, porém, rejeita as narrativas simples, e argumenta a favor de uma compreensão com nuances dos diversos processos e dinâmicas entre os estilos de agricultura da soja e as interações dos atores como parte de um sistema agroalimentares em acelerada mudança. Isto é feito com um estúdio de caso - no município de Querência no Estado de Mato Grosso, Brasil. O análises se baseia no estúdio de narrativas (as formas como diferentes pessoas falam sobre a agricultura e seus objetivos) e de práticas (diferentes estilos de agricultura e estratégias de vida). Em particular, a pesquisa explora como a heterogeneidade dos estilos de agricultura de soja - contrastando agricultores de grande, média e pequena escala - é construída em um lugar em específico. Oferece em troca um relato mais diferenciado do que as avaliações-padrão polarizadas dos estilos de agricultura e suas implicações. Assim contribui para uma compreensão de como as políticas e práticas relacionadas com diversos sistemas agroalimetares da soja no Estado de Mato Grosso se desenvolvem. Isso aponta para como as noções de desenvolvimento rural são construídas e como os caminhos para o desenvolvimento sustentável são vistos.

To my grandparents
Gloria, Carlos, Julia, y Luis.
Por el orgullo de ser su nieto

Ave Maria meu Deus, nunca vi casa nova cair
Vi a casa velha cair, mais nunca vi casa nova cair

Traditional Capoeira song[1]

Y al fin y al cabo, actuar sobre la realidad y
cambiarla aunque sea un poquito,
es la única manera de probar que la realidad es
transformable.[2]

Eduardo Galeano,
fragmento de "*Son cosas chiquitas"*

[1] "Ave Maria my God, I never saw a new house fall; I saw an old house fall, but never a new house fall". Paradoxically many land reform settlers in Querência had seen their newly built houses blown by the wind. The houses had been built with sand rather than cement by the government hired constructors as a way to deviating resources. In contrast the houses recently built by soybean producers seemed to be long lasting houses.

[2] At the end, acting over reality and changing it even if it is a little bit, is the only way to prove that reality can be transformed.

Acknowledgments

My biggest appreciation goes to all the farmers who kindly allowed me to stay in their houses and visit their farms without knowing me personally. I am in debt to them for sharing their time, food and ideas. In my search for knowledge they had a lot to teach me, some of which is in this research.

This research was possible with the financial support of the *Consejo Nacional de Ciencia y Tecnologia* (CONACYT) from Mexico. It sponsored my MPhil degree, for which I researched the use of genetically modified soybean across scales of production in southern Brazil. This allowed me to study the origins of soybean production in this country. Then their support continued for the PhD.

In Brazil I received infinite help from academics and institutions. I would like to thank João Carlos Barrozo, who enthusiastically received me at the *Núcleo de Estudos Rurais e Urbanos* (Centre of Rural and Urban Studies, NERU) of the *Universidad Nacional de Mato Grosso* (Federal University of Mato Grosso, UNMT). I am thankful to him for the dedication to read my research proposal, the long conversations, and the advice he gave me when I needed it; he became the interim advisor of this project. The centre provided a desk, access to a computer, a library, and an environment to organize the different stages of my field work. Thanks to Sueli Pereira Castro and Carlos Alberto Castro for sharing their space and their wise advice to solve my research dilemmas. I shall also thank João Flavio Veloso and colleagues, from Embrapa-Agrossilvipastoril, for the contact with farmers participating in their program of Agriculture, Cattle and Forest integration (iLPF in Portuguese) in Mato Grosso (MT).

The nature of my research required requesting help from people and institutions that held different and opposing views among them. I shall thank them equally for their valuable help. Two people were crucial in facilitating my contacts with farmers, particularly the unions: Victo Hugo Garbin, who works as a consultant for the *Ministerio de Desenvolvimiento Agrario* (Ministry of Agrarian Development), and dedicates his work to strengthening small-scale family farming in MT, facilitated the access to the (small-scale farmers) Rural Workers Unions in various municipalities. Luiz Nery Ribas, the Technical Manager of the *Associação dos Produtores de Soja do Estado de Mato Grosso* (Mato Grosso Soy and Corn Growers Association, APROSOJA), connected me with soybean farmers' representatives and the (large-scale farmers') Rural Unions in the municipalities I visited. The support of both was central to my research objective of studying diverse ways of farming.

During the time I spent in Querência, many people engaged in and contributed to my research; I am grateful to them all. I want to thank Gerda and Milton Eichholz doubly. Not only did they share their rich knowledge about the area and their life experience – as early migrants to the Querência Colonization Project and advocates of family farming and agroecology – but they gave me a place in their house. They also shared their

newspaper archive, from where I was able to track the agriculture narratives in the late 80s and early 90s, particularly that of the colonisation cooperative COOPERCANA. By being with them I was able to learn about other aspect of life and politics in Querência that, although outside the focus of my research, enriched it. Gerda was the founder of the *Escola Municipal Família Agrícola de Querência* (Querência's Rural Family Municipal School, EMFAQUE), a rural school directed mainly to the children of small-scale farmers. Getting to know its history added another dimension to my understanding of the rural development in the municipality. I was invited to present my work to the students, and their questions enriched my research. Finally, I want to thank the Hotel Avenida and its staff, to the owners for sharing their life histories as early migrants and farmers, and to the cooks because they made sure that the morning I woke up there was fresh and warm *pão de queixo* (cheese bread) that gave me a good start of the day. There I met many of their clients, among them there were agriculture service providers, fiscal agents from the environmental agency IBAMA, Embrapa researchers, politicians, etc. The hotel became a place to gather information.

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One person was fundamental in making my doctoral experience a balanced one. I am grateful to Linda for all the fun time that made my PhD much more pleasant. Also for reminding me of the obvious when I was absorbed by finding differences, "similarities are also important". I own her the patience she had in revising initial drafts. Last, I thank her for whispering in my dreams the words and thoughts I was looking for.

A very special thank you to my family. Thank you very much for all your support Alicia, Arturo, Julieta y Jorge.

Obrigado, thank you, gracias,
Mateo M.y T.G.C.

Dar Es Salaam, Tanzania
May, 2013

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List of abbreviations and acronyms

ABAG	*Associação Brasileira do Agronegocio* (Brazilian Agribusiness Association)
ABIOVE	*Associação Brasileira das Indústrias de Óleos Vegetais* (Brazilian Association of Vegetable Oil Industries)
ABRANGE	*Associação Brasileira dos Produtores de Grãos Não Geneticamente Modificados* (Brazilian Association of Producers of Non-Genetically Modified Grains)
ANSA	*Associação Nossa Senhora da Assunção* (Asociation Nossa Senhora da Assunção)
APP	*Area de Preservação Permanente* (Area of Permanent Preservation)
APROSOJA	*Associação dos Produtores de Soja do Estado de Mato Grosso* (Mato Grosso Soy and Corn Growers Association)
AXA	*Articulação Xingu Araguaia* (Xingu Araguaia Articulation)
CAR	*Cadastramento Ambiental Rural* (Rural Environmental Registry)
CAT	*Clube Amigos da Terra* (Friends of the Land Club)
CNA	*Confederação de Agricultura e Pecuária do Brasil* (Agriculture and Livestock Confederation of Brazil)
CONTAG	*Confederação Nacional dos Trabalhadores na Agricultura* (National Confederation of Agricultural Workers).
COOPERCANA	*Cooperativa Mista de Canarana* (Cooperative *Mista* of Canarana)
CPT	*Comissão Pastoral da Terra* (Pastoral Comission of Land)
EMBRAPA	*Empresa Brasileira de Pesquisa Agropecuária* (Brazilian Agricultural Research Corporation)
EMPAER	*Empresa Mato Grossense de Pesquisa, Assitência Tecnica e Extenção Rural* (Mato Grosso Company for Research, Tecnical Asistance and Rural Extension)
FAO	Food and Agriculture Organization of the United Nations
FASE	*Federação de Organizaçoes de Asitencia Social e Educativa* (Federation of Organisations of Social and Educational Assistance)
FOMAD	*Forum Matogrosense de Medio Ambiente e Desenvolvimento* (Matogroso Forum of Environment and Development)
GFN	Global food networks
GMOs	Genetically Modified Organisms
GVC	Global value chains

IBAMA	*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* (Brazilian Institute of Environment and Renewable Natural Resources)
ICV	*Instituto Centro de Vida*
IFC	International Finance Corporation: World Bank Group
iLPF	*integração Lavoura Pecuaria e Floresta* (Agriculture, Cattle and Forest integration)
INCRA	*Instituto Nacional de Colonização e Reforma Agrária* (National Institute of Colonisation and Land Reform)
INPE	*Instituto Nacional de Pesquisas Espaciais* (National Institute for Space Research)
IPAM	*Instituto de Pesquisa Ambiental da Amazônia* (Amazon Environmental Research Institute)
ISA	*Instituto Socioambiental* (Socio-Environmental Institute)
LAU	*Licencia Ambiental Única* (Unified Environmental Licence)
LRS	Land Reform Settlement
MAPA	*Ministério da Agricultura, Pecuária e Abastecimento* (Ministry of Agriculture, Livestock and Food Supply)
MDA	*Ministerio do Desenvolvimento Agrario* (Ministry of Agrarian Development)
MST	*Movimento Dos Trabalhadores Rurais Sem Terra* (Movement of Rural Landless Workers)
MT	Mato Grosso
PIX	*Parque Indigena do Xingú* (Xingu Indigenous Park)
RL	*Reserva Legal* (Legar Reserve)
REDD	Reducing Emissions from Deforestation and Forest Degradation
RR	Roundup Ready
RS	Rio Grande Do Sul
RTRS	Round Table on Responsible Soy Association
SC	Santa Catarina

WHRC	Woods Hole Research Centre
WIT	Wawi Indigenous Territory
WWF	World Wide Fund for Nature
ZSEE	*Zoneamento Socio-Economico Ecologico* (Socio-Economic and Ecologic Zoning)

Glossary

Acerola	Tropical fruit *Malphighia Punicifolia*
Agricultura familiar	Family farming, a legal category defined in Brazilian Law n. 11.326.
Agricultura Patronal	Refers to farms run with hired labour, as in corporate farming.
Agrofloresta	Agroforest
Agropecuaria	Agropastoral
Agrovilas	Agricultural towns, planned in colonisation projects and land reform settlements in Mato Grosso.
Alambique	Alambic: distillery apparatus
Amazonia legal	Legal Amazon
Arco do Desmatamento	Arc of deforestation. Common denomination to the band where deforestation is concentrated, that extends at the east and south of the Amazon Biome, from Maranhão to Rondõnia.
Arco de Fogo	Arc of fire. Refers broadly to the same area as the arch of deforestation, and use to denominate the target area of policies to control fires and burning.
Arrobas	A unit of weight used for cattle (14.7 kg)
Assentados	Settlers. Used in Brazil to refer to land reform settlers
Banco do Brasil	Bank of Brazil. Brazil's largest bank, not the central bank
Bagaço	Bagasse
Bazuca	Literary bazooka, referring to grain carts with a tube to unload
Bolsa Familia / Bolsa	Government programme. Refers to those who receive government benefits, often in a disapproving manner,.
Cachaça	Sugarcane spirit
Cajú	Cashew nut
Cartera assinada	Signed working papers. An official document showing registration as a worker that gives legal rights
Cerrado	Names of the Brazilian savannah
Chacarero	Person making a living off a *chácara*

Chácara	A term used in Brazil to describe several kinds of properties with rural characteristics. In this thesis it is used in the same way as in Querência, i.e. referring to small-scale farms
Chuquira	Tall grass
Churrasco	A Brazilian barbecue
Clase patronal	Employers' or managerial class
Condominio	Legal term for an association of rural producers with shared infrastructure
Correçao do solo	Soil correction, e.g. treating the soil with limestone
Corrego	Brook or stream
Defensivos	Casual word referring to agrochemicals or pesticides
Desecar	To dry, process of drying a plant with herbicides
Fazenda	Farm, often associated with large holding
Fazenda caprichada	Well organized farm, were the effort to manage it is seen
Feijol de porco	Beans planted for green manure
Ferro velio	Metal scrap, used in reference to old agricultural machinery
Gaucho	Reference to people in south of Brazil who share a particular culture
Garimpeiros	Small miners, artisanal miners, or worker miners
Graviola	Brazilian fruit of *Annona muricata*, a broadleaf, flowering, evergreen tree: soursop
Ingenio	Sugar mill
Ilerando	Clearing forest from a plot using chains between tractors and accommodating the trunks in rows along the plot.
Latifundia, Latifundios	Large estates typically owned by elites.
Leiras	Furrows from clearing the forest
Licenciamento Ambiental	Environmental Licensing/Registration
Mate	Mate: a popular caffeinated herbal tea made from *Ilex paraguariensis*, a species of holly (family Aquifoliaceae)
Mato	Informal name for 'forest'
Melado	Sugarcane by-product; molasses
Muvuca	A mixture of seeds that can be planted together: a technique researched and promoted by ISA for reforestation around the Xingu Park (PIX)
Nata	Cream

Palmito	Palm tree heart
Parcelero	Owner of a piece of land referred as *parcela* (plot), a term associated with land reform settlers
Patronal	Employer (an official class category of farmers in Brazil)
Plantio direto	No-till farming
Pecuarista	Person that breeds cattle. In Brazil refers often to owners of cattle ranches
Pequeno produtor	Small-scale farmer
Posseiros	Literally squatters. In Brazil a recognised legal category with a set of rights.
Popunha	Peach palm (*Bactris gasipaes*)
Pre-limpieza	Pre-husking
Produtos coloniaes	Colonial product. Refers to handmade products on farms, related to *gaucho* culture.
Rodas de chimarron	Circle where *mate* (herbal tea) is shared
Ruralistas	Refers to a congress bloc associated to large-holding ownership and agribusiness
Safra	Farming season from planting to harvesting
Sede	Homestead on the farm
Serrerias	Timber mills
Soja loca	'Crazy soy': a new and mysterious disease of soy associated with a black mite which is causing severe yield losses
Sulistas	People from the south of Brazil
Terra vermelha	Red soil, or clayish soil
Troca	Exchange
Urucum	Annatto: seeds with a red pigment derived from Achiote (*Bixa orellana*), a small tree
Yabuticaba (Jabuticaba)	Native tree of Southeastern Brazil (*Plinia cauliflora*) grown for its purplish-black, white-pulped fruits which are eaten raw or used to make jellies, juice and wine
Yaka	Jackfruit tree (*Artocarpus heterophyllus*) widely cultivated for its distinctive sweet fruit
Varjões	Swamp areas, quagmire

Chapter 1

Introduction

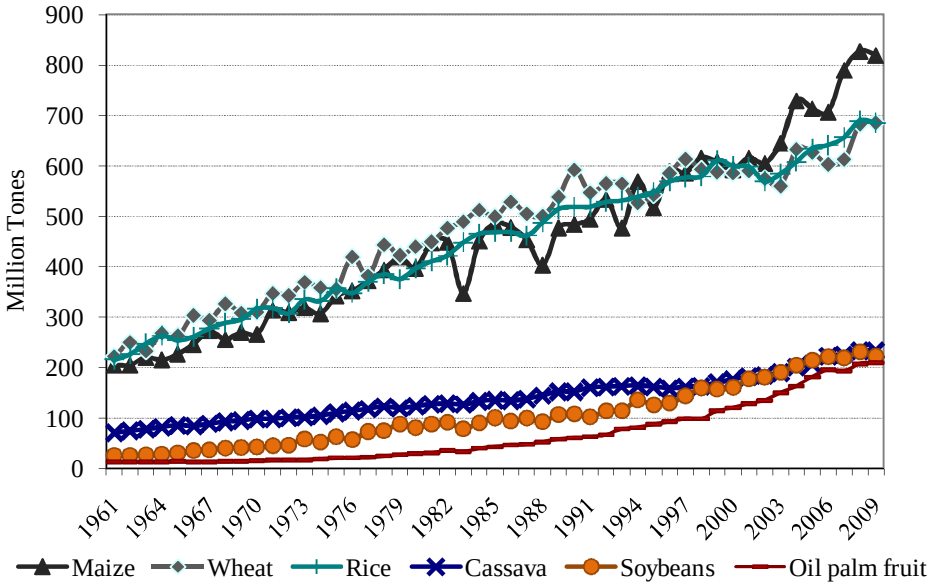
In the last decade, particularly after the 2008 world food crisis, concerns about world food production started to receive increasing attention on the international development agenda. One highly contested debate revolves around who should produce food, and how (cf. World Bank 2007; IAASTD 2008). Should governments around the world focus on large-scale commodity production for export to alleviate poverty, increase food production, and promote economic growth and development? Or should the focus be on an agriculture that has small-scale farmers at the centre of sustainable rural development? Such questions have encouraged actors at multiple levels to advocate for or discourage particular ways of producing food around the world. It is in this context that in recent times the production of soybean, mainly in Argentina and Brazil, has been used as an example of success or failure of a particular model of agricultural production.

Applying a case study approach, this research offers empirical insights into how policies and practices related to the diverse soybean agri-food systems in Mato Grosso state are played out. This sheds light on how notions of rural development are constructed and how pathways to sustainable development are seen by different actors and interests. In particular, the research explores how different groups of farmers – contrasting large-scale soy farmers, medium-scale farmers and smallholders – understand and practise farming in one of the most rapidly changing frontier regions in Brazil. An examination of narratives (the ways different people talk about and construct farming and its objectives) and practices (different farming styles and livelihood strategies) informs this analysis. The aim is to explore how the heterogeneity of soybean farming styles is constructed in a particular place – offering in turn a more nuanced account of the standard, highly polarised assessment of farming styles and their implications.

Contrasting narratives and soybean farming styles in Brazil

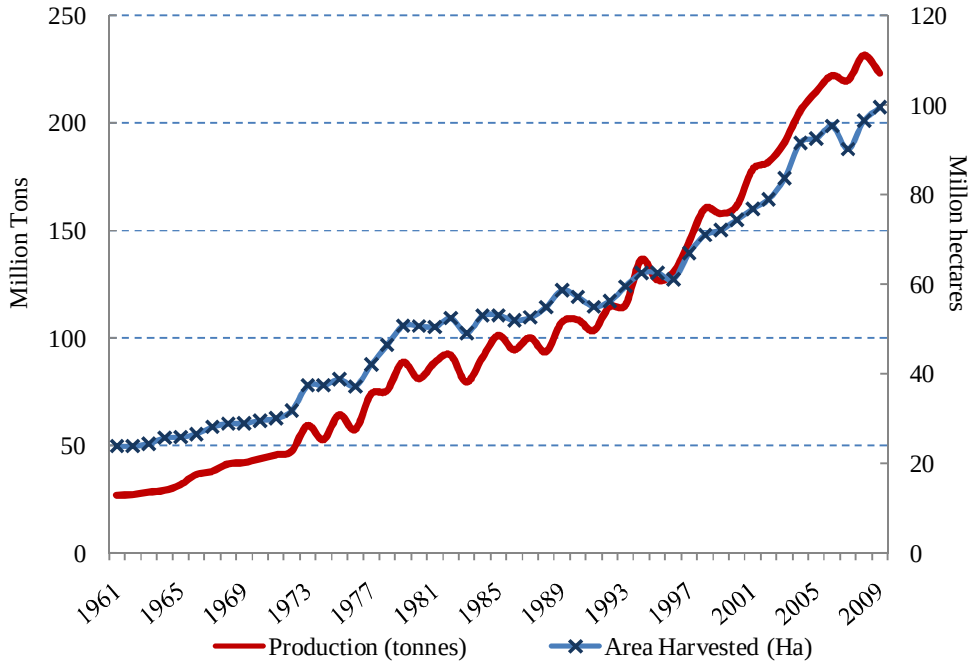
The exponential growth of world soybean production, concentrated in just a few countries, indicates the economic, environmental and social relevance of this crop and the scale of its effects (see Figures 1.1 and 1.2). Expansion of soybean production since

Figure 1.1: World production of six main crops (1961 to 2009)



Source: FAOSTAT, 2010

Figure 1.2: World soybean production and harvested area (1961 to 2009)



Source: FAOSTAT, 2010

the 1970s has made Brazil the second largest producer in the world (28% of the world's production in 2011/12) after the USA (35%), and Argentina not far behind (17%) (USDA 2013). The increasing consumption of meat, eggs and milk in the world is

considered to be the main driver of this expansion, as soybean has become an important source of protein feed for livestock (primarily poultry and pigs) and a cheap edible oil source (Delgado et al. 1999; Ozeki et al. 2001). The expansion of production of this export crop has made Brazil a key country in the global soybean agri-food system.[3]

The popular image of a convoy of tractors advancing over thousands of hectares of soybean in a 'V' formation has been used to symbolise both the advancement of modern farming technology and the devastation of the Amazon rainforest, a bane to indigenous and small farmers' livelihoods. Indeed, the economic, social and environmental benefits and impacts of the process of agricultural expansion are highly contested. Nevertheless, the complexity behind that image is rarely depicted. Instead, simplistic and monolithic notions of what in Brazil is commonly called *agronegocio* (agribusiness), and linear interpretations of the expansion of soybean are offered.

Three narratives are evident. First, there are those who argue that the scale and scope advantages of large farms are indicators of economic success and progress towards modern agriculture (Dall'Agnol et al. 2007; Lovatelli 2007; Pinazza 2007; Collier 2008; APROSOJA, 2010). By contrast, others argue that the high concentration of land in the hands of few owners, the expropriation of land from indigenous people, the marginalisation of small farmers and the environmental damage caused by industrial farming are major obstacles to creating a sustainable and just society (Bickel and Dros 2003; Schlesinger 2006). A third narrative has been taking shape in the past decade, involving the definition of sustainable soybean production in practice as well as symbolically. This has unfolded from the involvement of environmental groups in discussing and contesting land use change, particularly in the Amazon forest. The main actors creating this narrative, to promote changes in the practices of soybean producers, have been the international Non-Governmental Organisations (NGOs), including Greenpeace and WWF, and Brazilian NGOs such as *Instituto Centro de Vida* (ICV) and *Instituto Socioambiental* (ISA).

[3] An agri-food system is conceived here as comprising not only food production but also processing, packing, distribution, retail and consumption (Ericksen et al. 2009; Thompson and Scoones 2009; Ericksen 2008; Thompson et al. 2007)

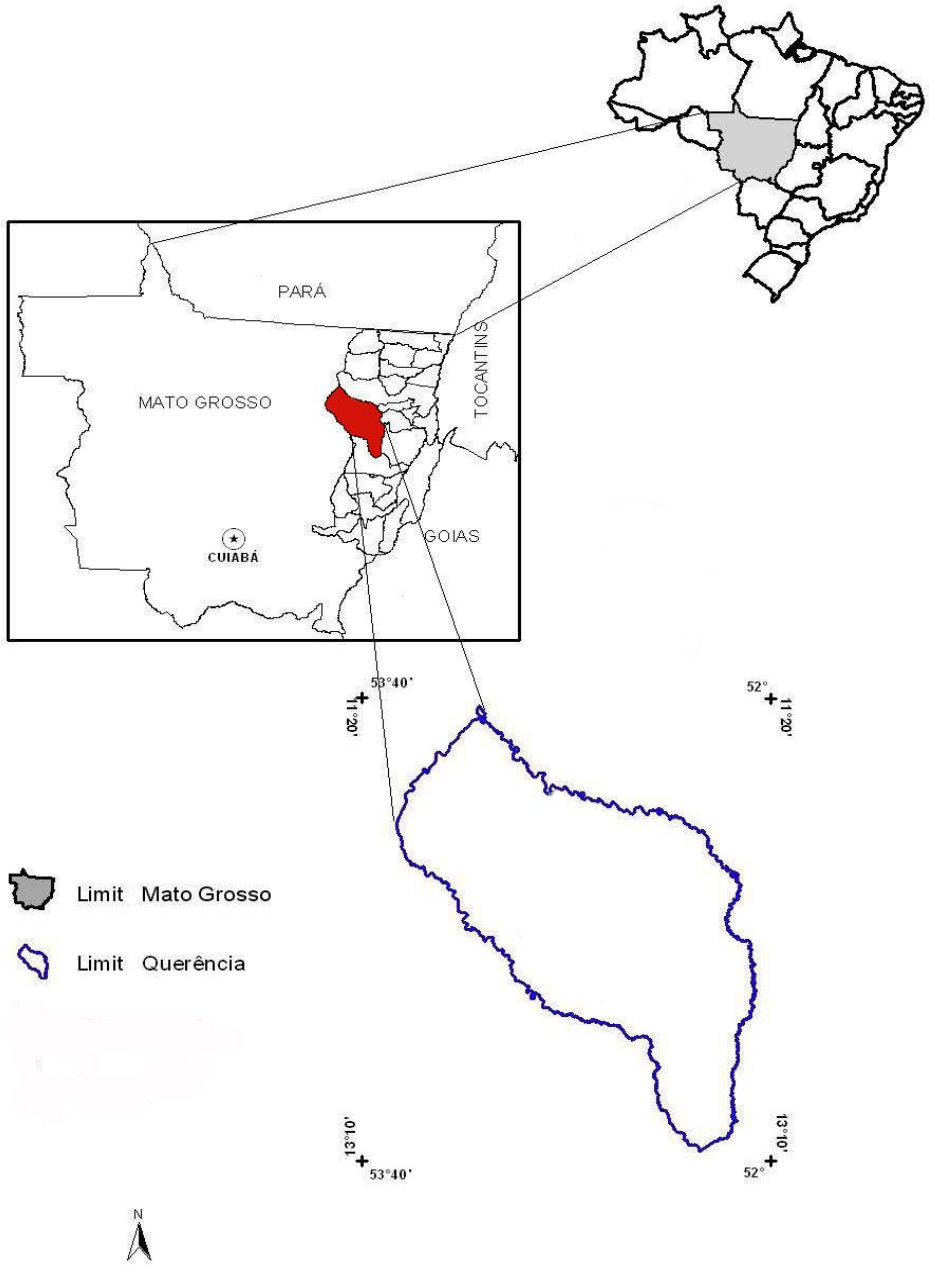
The single trajectory of soybean production suggested in these narratives finds resonance in what is occurring in particular localities: a dominant trend of increasing technical and organisational sophistication with exclusionary effects is undeniable. Moreover, the idea of a process of modernisation – to which all three narratives make reference in their own way – is a strongly convincing story. However, reducing the agrarian dynamics, the diversity of farming styles and the differences in livelihoods to a homogenous phenomenon in all soybean production regions in Brazil, particularly the Amazon forest and the state of Mato Grosso (MT), limits the capacity to understand processes of socio-technical, socio-economic, and socio-environmental transformations, as well as the existence of diverse pathways related to the soybean agri-food systems.

The discursive antagonism between the above narratives is paralleled by the existence of two distinct ministries dealing with agriculture: the Ministry of Agriculture, Livestock and Food Supply (MAPA in Portuguese) and the Ministry of Agrarian Development (MDA in Portuguese). The contestation over policy directions and subjects at stake defines the political process dynamics between these two ministries. In broad terms, the MAPA is oriented towards agribusiness, and the MDA deals with rural workers, family farmers and agrarian reform (von der Weid 2006). This has led to an institutional differentiation of agricultural producers and traders according to their links to two broad categories, agribusiness and family farming. This institutional differentiation sets a particular context in which competing narratives about the soybean economy and its impacts are played out. However, as suggested by Medeiros (2001) and Heredia et al. (2006), in practice the definition and embracing of this categories is disputed. In fact, these two farming style categories do not delineate precisely the policies in these ministries and there is much greater variety between the extremes.[4]

This study therefore rejects the three simple narratives, and argues for a more nuanced understanding of the diverse processes and dynamic interactions between contrasting soybean farming styles and the actors associated with them as part of fast-changing agri-food systems. It does so through an analysis of the interaction between soybean farming styles and the socio-economic and environmental impacts of these in a particular context and place, the municipality of Querência-MT, Brazil (see Figure 1.3).

[4] An example of a Brazilian policy that does not rely on this division is a recent initiative of territorial rural development (*Territorios da Ciudadania* - Citizens' Territories), where producers are categorized according to multiple characteristics.

Figure 1.3: Localisation of Querência, Mato Grosso, Brazil.



Source: Map adapted from Costa Lopes (2006)

Key research questions

This research therefore answers the following questions for the case of Querência, Mato Grosso, and across farms of different scales of production:

1. **What policy narratives frame the way farming – and its socio-economic and environmental implications – is seen by different actors?**

2. **What farming and livelihood practices exist across farms of different scales?**

3. **How does this all shape the role of soybean within farming systems – and what are the broader implications for agrarian dynamics and sustainability?**

The eight case studies presented in this thesis – seven soybean producers and one agroecological family farmer – contribute to understanding the different livelihood strategies and heterogeneity of farming styles in Querência. This research offers a reinterpretation of the role of soybean production at the farm and municipal level, by taking a broader understanding of soybean agrifood systems than that provided by a value chain analysis (Bertrand et al. 1987; Bertrand and Théry 2004), and by situating the policy processes and agrarian dynamics in a particular locality.

Querência is characterised by a diverse land occupation pattern, including indigenous territories, mega-large scale holdings (*latifundios*), a private land reform project organised in 1985 by the *Coperativa Mista de Canarana* (Cooperative COOPERCANA), mainly with migrants from the south of Brazil, the creation since the late 1990s of land reform settlements (LRS), and the more recent intensification of soybean production, including the arrival in the 2000s of more capitalised farmers in search of larger scales of production. These, as discussed further below, are all processes that have shaped and continue to shape the farming styles in this municipality.

This thesis is organised as follows: the second chapter presents the theoretical framework that guided this research – including a discussion of different theoretical approaches that have influenced the way agricultural change is researched – and

includes a section on methodology. The third chapter expands on the narratives that are shaping the policy process around the sustainability of soybean production in Brazil, particularly in Mato Grosso. The fourth chapter positions the study location geographically and presents a brief history of land use and the current state of the agri-food systems in Querência. The fifth chapter is an exposition of eight cases of farmers, describing their life histories, farming styles, and the agrarian dynamics in which they are involved. The sixth chapter offers a comparative analysis of the empirical cases and presents a re-reading of the narratives presented in chapter three. The seventh chapter brings together an overall conclusion.

Chapter 2:

Structural dynamics and heterogeneity of micro-practices: theoretical framework and methodology

This research started from a multidisciplinary approach, relying on disciplines which explore society-nature relations from a broad perspective, consider multiple temporal and spatial scales, and acknowledge the importance of ethnographic accounts of history and policy processes. As an over-arching theoretical framework, a political ecology approach was used to address the key dimensions of environmental and social change, as well as the politics of agricultural transformation, from a perspective that recognises both the material (biophysical) and the subjective (perceptions and representations) (Scoones 1999; Forsyth 2003; Robbins 2004; Peet and Watts 2006).

Three particular aspects of this broad framework were emphasised with different analytical perspectives focused on different scales. First, at the macro-scale, an agri-food systems approach (Ericksen 2008; Thompson et al. 2007; Busch and Juska 2009; Thompson and Scoones 2009), drawing on political economy analysis (Bonanno et al. 1994; McMichael 1994; Goodman and Watts 1997), was used to examine the structures and dynamics of the global economy affecting farming systems. Indeed, the wider structural features of the soybean agri-food systems are important to gain an overall picture (Pasquis et al. 2004).

Second, policy process analysis helped in examining how different narratives – about agrarian policy, development and sustainability – are played out at different levels e.g. national and local (Roe 1991; Cronon 1992; Kaplan 1996; Fischer 2003; Keeley and Scoones 2003). It facilitated an exploration of how knowledge and power dynamics underlie the process of policy making and implementation, asking whose perspectives and interests predominate.

Third, at the case study level, perspectives from rural sociology that focus on farming styles offered depth on the micro dynamics within the agricultural production unit, particularly actors' daily practices (Ploeg et al. 2000; Sonnino and Marsden 2006; Ploeg 2008) and livelihood strategies (Scoones 1998; 2009; Bebbington 1999; De Haan and

Zoomers 2003). This research, then, links an analysis of agri-food systems, and an assessment of farming practices and livelihood strategies, to have a political ecology, multi-level analysis of policy process and the soybean agri-food systems.

In this theoretical chapter, I argue that using such a framework, soybean production in Brazil can be better understood as a dynamic process wherein multiple actors interact at multiple levels: agronomists deal with the science of plant genetics at the experimental stations as well as in the farms; farmers manage their farms, take decisions within their households, and participate in municipal politics and the development of soybean production regions; and governments and corporations act in policy processes, and deal with ecosystems, national politics and global markets. These actors interact in processes of knowledge formation that shape their practices. Within the complex dynamics of the soybean agri-food systems, a heterogeneity of farming practices and styles is shaped and in turn shapes agricultural and agrarian change.

This chapter is divided into five sections. The first describes in detail the political ecology framework used for this research. The second reviews political economy studies of agri-food systems, and their contribution to understanding broad structural changes. The third poses the relevance of narratives, and the role of networks, in the policy processes shaping farming practices. The fourth discusses the farming style approach and its usefulness to study micro-practices and heterogeneity of farming. The fifth draws on these theoretical elements to present the methodology followed in this research.

A political ecology framework

Political ecology has brought together characteristics from multiple fields (e.g. cultural anthropology, rural geography, post-modernism; see Forsyth 2003; Robbins 2004). It offers a theoretical stance for enquiring about resourc**e** management and environmental change and degradation, recognising in advance its normative agenda (by asking who benefits from the use of natural resources). In this sense, political ecologists look at the constantly changing relations, and mutually constructing dynamics, between nature and society, concerning both the impact on the environment and the livelihoods shaped in this interaction (including gender dynamics; Rocheleau et al. 1996). Furthermore, political ecologists recognise the importance of history in a non-linear and non-cyclical

fashion, and research spatial scales (Zimmerer 1994) and environmental history (Preston 1998; Batterbury and Bebbington 1999). Political ecology recognises that knowledge about nature and resource management is inherently political, and that narratives and perceptions are key in shaping both policy interventions and day-to-day practices (Scoones 1999). Thus, political ecology provides a lens for examining how soybean agricultural narratives and practices are conceived, shape and are shaped by nature and the politics of knowledge.

In socio-ecological systems humans have the capacity to shape and affect the environment, but nature has a life of its own that also shapes and affects livelihoods (Robbins 2004) and the practices within farming styles and agri-food systems. It is also in interaction with nature that heterogeneity of farming styles is formed, as exemplified below in case studies of farmers (see Chapter Five). The production of soybean as a commodity crop is often assumed to be detached from ecological dynamics due to the use of technologies that are geared to controlling nature and farming processes (Chapter Three on narratives). However, taking this detachment for granted leads to ignoring farmers' livelihood strategies and the socio-ecological systems in which commodity crop production is embedded. Acknowledging the relevance of these complex and dynamic nature-human interactions is critical to add nuance to the understanding of the soybean farming styles and agri-food systems.

From a political ecology perspective, environmental change and the contested construction of pathways to sustainability occur on multiple time- and spatial scales (Peet and Watts 2006; Brondizio et al. 2009; Scoones et al. 2007). This goes along with the understanding of the soybean agri-food system as multi-level and multi-dimensional. Moreover, this reminds us of the multiplicity of stakeholders and the various factors, including the production of knowledge, involved in the formation of particular soybean agri-food systems and farming styles. The interaction of these multiple actors involves particular ways in which natural resources are controlled and accessed, and therefore involves processes of negotiation and contestation "within the political arenas of the household, the workplace and the state" (Michael and Peet 2006, 12).

For the particular case of the Amazon, Browder and colleagues (2008, 1482) arrived at the conclusion that "rather than a dominant emergent master theory, the ‘big picture’ of frontier change patterns suggests a mosaic of local factors influencing socio-economic differentiation that is disarticulated from any single theoretical explanation". It is for this reason that this study takes a broad theoretical approach, aimed at capturing the diversity of particular circumstances at the local level, together with the wider structural processes.

This requires attention to the complexity of negotiation and contestation over the use of natural resources, and farmers’ livelihood strategies need to be considered in interaction with changing nature, as well as in relation to a much broader political economy processes. Thus, the construction of landscapes, the management of natural resources, and the changes in land use are better understood by considering both micro-processes and the "broader structural political and ideological processes" (Scoones 1999, 485). Therefore, a political ecology perspective offers a theoretical approach to considering, in one study, the structural political economic features of the soy agri-food system, the broad policy narratives and actor perceptions around soybean production shaping and being shaped by the interaction of multiple stakeholders, and the micro-processes in which policy interventions are translated to everyday practices and spatially defined effects. The following three sections outline these three elements of the study’s political ecology framework.

Political Economy of Agri-Food Systems

The production of soybean as a commodity, more than any other crop, is associated with the formation of world agri-food systems. The structural features of these systems have been of substantial research interest, particularly among political economists. Their characterisation within political economy studies differ. Indeed the different terminologies, from world food regimes (Friedmann 1982; McMichael 1994; McMichael 2009), and agrofood system (Watts 1996) to global value chains (Gereffi et al. 2001; Gereffi 2007; Henson and Humphrey 2010) and agribusiness (Wilkinson 2009), reflect the diverse foci of research (Buttel 2001; Niles and Roff 2008). This multiplicity of terminology leads to different understandings of the current dynamics of agricultural transformation and agrarian change around the world. However, overall these studies give insights into how commodity crop production, such as soybean

farming, and its effects have been understood in relation to broad structural changes. These range from the configuration of global interest groups, such as corporations, that pursue the hegemony of a particular food regime (Friedmann 1982; McMichael 1994), and the diffusion of particular technologies and financial arrangements that allow the expansion of an agro-industrial mode of production (Goodman et al. 1985; 1987), to the creation of new forms of governance of global value chains (GVC) that define the distribution of surplus value, standards of production, and flows of knowledge, among other aspects (Kaplinsky 2000; Gereffi et al. 2001; Gibbon 2001a; Gereffi 2007; Humphrey 2008).

In recent decades, political economists have emphasised the process of globalisation – or internationalisation – of world food production. Of particular concern is that a few multinational corporations organise and increasingly control, at a global scale, how food is produced, processed, traded and consumed (Bonanno et al. 1994; Goodman and Watts 1997; Murdoch et al. 2000; Goodman 2002; Thompson et al. 2007). From the approach of food regimes, in the current context of neoliberal policies, the multinational corporations are the actors with a dominant position to define the regulating environment – set by the regulations of world trade, property rights, and macroeconomic policy – and operate as structuring forces of world food production, division of labour and terms of trade globally (Friedmann 1982; McMichael 1994). This characterises the food regimes, and therefore it is the locus of transformation at a global scale. From this perspective, the corporate food regime has permitted the assimilation of highly specialized commodity producers by a process of accumulation and concentration into a few corporations, and has excluded the majority of small-scale producers, who mobilise to counterbalance its effects (McMichael 2009). From a perspective of food regimes, commodity production, such as soybean production, is then defined by corporations, and as a result farmers' strategies are completely shaped by corporate interests.

Other political economy research has contributed to understanding how industrial capital –through the diffusion of technology and financial arrangements – has defined the modernisation of rural labour and consolidated the predominance of agro-industrial modes of production, particularly since the 1970s (Mann and Dickinson 1978; Müller 1982; Szmrecsányi 1983; Goodman et al. 1985; 1987). This double transformation –

modernising the rural labour process and consolidating an agroindustry – has led the way to the formation of world agri-food systems. From this perspective, government and agro-industry policies to modernise the rural labour process – mainly through distributing hybrid seeds, machinery, agrochemicals and synthetic fertilisers, and financing agricultural production using this technology – have allowed different agro-industries to progressively overcome the limits of nature, e.g. controlling production time. This policy process has given this mode of production a predominant position affecting agrarian social structures in distinct ways.

Moreover, this analysis brings insights into how agroindustrial interests were formed around a particular set of technologies and have encouraged capital interest groups to intervene in the control of agricultural production, whilst at the same time appropriating surplus value. In addition, in the modernisation of the rural labour process, farmers who have engaged in these changes started to become politically organised around various demands, which differed from those of rural workers (Goodman et al. 1985). These were no longer centred around land access, but instead were related to the prices of inputs, access to credit, the cost of production and state agricultural policy (Goodman et al. 1985; 1987). In this sense, these authors point out a class differentiation in terms of the interest generated around an agroindustrial style of production. This aspect of interest formation, as the farming case studies in chapter five reflect, is relevant to understanding the socio-political and economic organisations of soybean producers in Querência-MT in particular (see also Azevedo and Pasquis 2009).

Studies of Global Value Chains (Kaplinsky 2000; Gereffi et al. 2001; Gibbon 2001a; Kaplinsky and Morris 2002; Gereffi 2007; Humphrey 2008) and food networks (Dicken et al. 2001; Renting, Marsden, and Banks 2003; Goodman 2004; Marsden, Banks, and Bristow 2000) have contributed to understanding the organisation and dynamics within corporations and other forms of food production enterprises. These studies have highlighted the relevance of governance as the dynamic that – besides determining "how financial, material, and human resources are allocated and flow within a chain" – define relations and practices within GVC (Gereffi 1994, cited in Dolan and Humphrey 2004, 492; Gereffi 2007; Gibbon and Ponte 2008). A common concern in GVC and food network studies is who benefits from these governance arrangements, or relations of production, processing, trade and consumption (Kaplinsky and Morris 2002). This

raises questions as to which governance mechanisms exclude and include particular actors, and how (Henson and Humphrey 2010): issues that still remain crucial to understanding the dynamics of governance of soybean agri-food systems. For example, genetically modified seeds (GMOs) and certification arrangements are both determining the governance of soybean agri-food systems in Brazil. The first affects practices at the field level and the distribution of surplus between actors (Pelaez and Schmidt 2000; Mier y Terán 2008); the second defines standards of production, traceability arrangements, and organisation of trade (de Sousa and Busch 1998; Wilkinson 2002).

Political economy has been crucial in understanding structural transformations taking place at a global scale. However, its contribution to understanding agri-food systems has been criticised in certain aspects. First, the development of agri-food systems should be understood in a dynamic, rather than linear conception of history (Thompson et al. 2007). Second, governance regimes or structures should not be attributed absolute dominance and homogenous effects. Instead a perspective of actor-networks, with a focus on the interrelations between human and non-human, can contribute to understanding how control and domination occur and do not occur (Law 1992; Lockie and Kitto 2000; Busch and Juska 2009). Moreover, uneven, multidirectional, multilevel and contingent effects have to be acknowledged (Brondizio et al. 2009; Thompson and Scoones 2009), including constant processes of contestation and negotiation of governance arrangements. Third, locality and farmers' agency have to be considered in order to, on the one hand, better comprehend the effects of global food systems in particular places, and their uneven development, and, on the other hand, recognise processes of embeddedness not only of alternative, local food networks, but also of global commodity networks (Buttel 2001; Mior 2005). A political ecology approach, with a focus on the heterogeneity of farming styles, as advocated in this thesis, can contribute to overcoming these limitations.

Policy process analysis

Political economy perspectives are complemented by policy process analysis, with a focus on knowledge dynamics, particularly how policy narratives frame practices. From the perspective of policy process analysis (Keeley and Scoones 2003), the formation of socio-ecological, as well as socio-technical and socio-economic systems, is inherently

political and involves complex processes of knowledge construction. In this sense, agricultural activity and transformation can be understood as a process of knowledge formation that includes narratives and practices, as well as the production of food. Furthermore, as Keeley and Scoones (2003, 38) show, "knowledge is established as: a reflection of structured political interests; a product of the agency of actors engaged in a policy area; [and as] part of overarching power – knowledge relations that discursively frame practice in particular ways". Thus policy processes shaping farming systems can be studied by tracing knowledge formation, particularly through the creation of narratives, or stories that have a beginning, middle and end (Kaplan 1996), and by identifying the actors and networks that sustain and reproduce this knowledge (Roe 1991).

A study of policy narratives is proposed here to show the multiple controversies that are at stake in soybean agri-food systems. Moreover, by examining policy narratives, the intention is to illustrate the commonalities and differences in the stories told by different actors to interpret the same phenomenon (Cronon 1992). Policy narratives are taken here to include, as well as actual stories, the framing of problems and the solutions that guide decision making. From this perspective, then, the narratives and practices of diverse soybean farmers can be studied, illuminating how narratives and farming practices are mutually constructed. This research maps the network of interests related to different farming styles, the power dynamic in the use of resources, including information, and the narratives that frame farming practices (see Methodology below). By doing this, competitive, co-existent and conflictive dynamics between different farming narratives and practices are identified.

Farming practices and styles

As a complement to the previous two perspectives which take a broader, more macro-analysis view of power, politics and knowledge dynamics, rural sociology and food geography studies provide a focus on the micro-practices of agricultural production (e.g. Arce and Marsden 1993; Hinrichs 2000; Murdoch et al. 2000; Ploeg et al. 2000; Shneider 2004; Ploeg 2008). These authors focus on farmers´ practices and views and have contributed to understanding diverse ways of farming. In particular, according to Jan Douwe Van der Ploeg, farming styles research has been "about exploring and understanding heterogeneity" (Ploeg 2010, 1). Engaged with an actor-oriented approach

(Long and Long 1992) and the work of rural sociologist E. W. Hofstee, Ploeg and colleagues have helped advance a basic definition of farming styles: first, understood as a unit of discourse and practice; second, expressing "how farmers combine and order the elements that are used in the process of agricultural production"; and third, that these styles "represent specific connections between the economic, social, political, ecological and technological dimensions" or how a particular resource combination is linked to the outside world (Ploeg 2003, 101 cited in Van Averbeke and Mohamed 2006, 138; Ploeg 1994; 2008; 2010; Marsden et al. 2001; Schmitzberger et al. 2005). This initial definition has given the basis for further exploration and refinement of the understanding of farming styles.

Farming styles, expressed in a particular location as patterns of farming – which tie together land, labour, seeds, machines, knowledge, networks, expectations and activities – are known to farmers and form part of a "socially mediated" knowledge that allows "strategic responses" driven by farmers' goals (Jan Douwe Van Der Ploeg 1994, 26). The agency and strategic responses of farmers are thus conceived as bounded by ´structuring principles´ that derive from the linkages of farming practices with other dimensions and their embeddedness in a particular context. Moreover, agricultural producers have "room for manoeuvre" in which their strategic reasoning is expressed, but the specific social relations of production in other dimensions condition space and time, that is, the organisation of the farm and the structuration of the labour process (Jan Douwe Van Der Ploeg 1994). Farming styles, then, are to be understood in terms of relations, and the conditioning of farmers' practices and views these relations involve.

Moreover, from this perspective farming is not only about producing an end-product, but also about "*actively making* things, resources, relations and symbols" (Ploeg 2008, 26). Indeed, knowledge creation and farmers' experiences take place within the process of farming (Vanclay et al. 1998; Schmitzberger et al. 2005; Ploeg 2008). Through observation, interpretation, evaluation, and communication of knowledge with other farmers and stakeholders, farmers get to know the different patterns of farming and its relations to technology, nature, markets, policy, and livelihoods. In this sense, farming styles are socially constructed projects, reflecting patterns of farming, rather than sole, isolated or individual ways of farming.

By bringing farming styles and heterogeneity to the forefront of analysis, Ploeg and colleagues have helped advance the debates on farm efficiency, previously viewed solely in terms of one dimension, be it land size or the productivity of small-scale and large-scale farming, to consider farming in relation to multiple dimensions. The heterogeneity of the farming styles is conceived as a range, in terms of *degrees* of, for example, integration with the market, detachment from nature, specialisation of production, or technological intensification (Toledo 2002; Bernstein and Campling 2006a; 2006b; Ploeg 2010).

In a more recent publication Ploeg (2008) has integrated theoretical insights on farming styles with a political economy perspective. As a result he has included in the definition of farming styles a framework to characterise the heterogeneity found in agri-food systems:

> "[Farming styles are] patterns of coherence underlying [the] heterogeneity that exists in […] agricultural systems [….] These styles represent the material, relational and symbolic outcomes of strategically ordered flows through time. Taken together, they make up a richly chequered range that extends from different forms of peasant agriculture, via highly complex combinations, to different expressions of entrepreneurial agriculture" (2008, cited in Ploeg 2010, 5)

From a farming styles perspective, the broader dynamics of agrarian change are conceived in terms of competing styles of farming – and how corporate, entrepreneurial and peasant modes of production interact. In this competitive process between farming styles, many argue that large-scale, 'modern' agriculture is the way of the future; in contrast, Ploeg (2008) and colleagues argue that a 're-peasantisation', or increasing incidence of the peasant way of farming, is occurring in many places (see Chapter Three for this discussion in the case of soybean production). The exploration of these dynamics in the Brazilian context in Querência-MT as a key site undergoing major agrarian transformation offers an important contribution to this debate.

This perspective offers an approach to studying the formation of farmers' views and different day-to-day practices that shapes farming styles and agrarian dynamics, complementing the broad structures of agri-food systems highlighted by political economy studies. Moreover, it helps understanding of how "under similar production conditions and in comparable locations, farms are not necessarily managed in the same way" (van Averbeke and Mohamed 2006, 138); instead diverse farming practices – and

farming styles – can be seen as related in various ways to the agri-food systems (cf. Novo, Jansen, and Slingerland 2012).

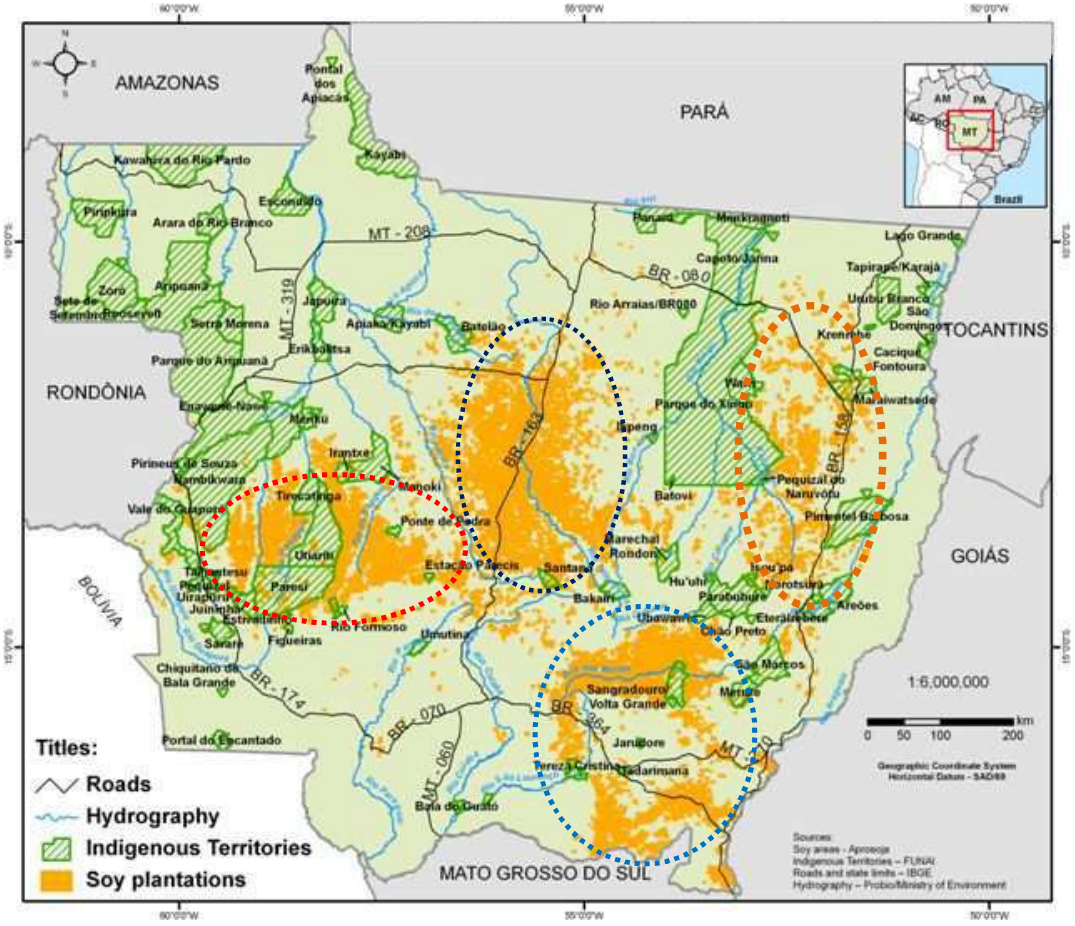
In sum, a political ecology approach allows us to explore who the actors are that are involved in the structures and dynamics of the global economy affecting farming styles in a particular location in Mato Grosso. Questions guiding this research were how actors' different narratives about the sustainability of the soybean agri-food systems are played out at the national and local scales, what knowledge and power dynamics these entail, and whose perspectives and interests predominate in the policy processes. Moreover, research into farmers' views, practices, and relations with other actors became crucial for scrutinising these narratives. It can be said that the broader narratives present in policy processes and network formations play out in the shaping of farmers' views and practices; but also farmers' strategic reasoning, expressed as farming styles, reflects an active, rather than passive, position in the production of knowledge and the shaping of soybean agri-food systems. How different farming styles and livelihood strategies are shaping and being shaped by the role of soybean within agri-food systems – and what the implications are for agrarian dynamics and sustainability, became critical questions in re-thinking the standard broad narratives.

Methodology: Actor-network mapping and cross-scale case comparison

This research takes a case study approach to the analysis of soybean production in the municipality of Querência in Mato Grosso, Brazil. It is also a study of the soybean agri-food systems and the agricultural and agrarian dynamics in that particular locality. The main phase of field research took place during a year of fieldwork in Brazil from September 2009 to September 2010. It involved various qualitative methods, described below, for a cross-scale comparison of eight farming cases. This was complemented with an actor-network mapping and a wide regional and national policy analysis.

The fieldwork was divided into three stages. First, the selection of Querência as the location of study, which involved visiting three out of four main soybean production regions in Mato Grosso (Figure 2.1) and carrying out 68 semi-structured interviews (see Appendix I). Second, the selection of farms for the cross-scale comparison. The main pre-established criteria were to select two large-scale farms of > 1,000 ha, two medium-scale farms of 1,000 < & >100ha, two small-scale farms of < 100ha, and two farms with

Figure 2.1: Four main soybean production regions in Mato Grosso, 2010



Source: Adapted from Repórter Brasil (Glass, Gomes, and Biondi 2011, 17)

agro-ecological practices of < 100ha. Third, using the backward mapping technique (Elmore 1979), the actor-network of each farmer case was tracked, which involved another 57 semi-structured interviews. Fieldwork in Brazil was divided into roughly six months in Querência and six months in 14 localities in Mato Grasso and the cities of Brasilia and São Paulo.

The municipality within MT was selected by comparing the major soybean production municipalities.[5] This process allowed me to track similarities and differences among the regions as well as to research the narratives and practices that occur in the state of Mato

[5] The municipalities visited were: Campo Novo dos Parecis, Sapezal, and Campos de Julhio in the Chapada dos Parecis; Sinop, Sorriso, and Lucas de Rio Verde in the BR-163; and Canarana and Querência in the Araguaia region. The fourth region, south of the state, around the city of Rondonopolis, is where soybean was first produced as a commodity. Today it is characterized by the presence of soybean processing industry and propagation of soybean seeds for the rest of the state. This area was not visited due to time restrictions.

Grosso as a whole, e.g. diversification, intensification, *integração lavoura pecuaria e floresta* (integration of farming, cattle and forestry, iLPF), and small-scale production. Broadly speaking, both the Chapada dos Parecis and the BR-163 regions, on the west and centre of MT respectively, compared to the Araguaia region, on the east of the state, have more diversified production of agricultural commodities (see Figure 2.1 above; VanWey et al. 2013). They grow sugar cane, cotton, sunflower seeds and poultry, and therefore have additional agroindustries (Faria 2008).

Three main criteria defined the selection of Querência, and make it a good example for illustrating the wider dilemmas, such as rapid land use change, deforestation, confrontation of farming projects, and imposition of one mode of production:

1) Located within soybean high production areas (that is agriculture dominated by soybean). This ensured the presence of major actors driving the soybean agri-food system, and allowed the study of dynamics of farmers' exclusion and inclusion. In 2009, the ten largest soybean producing municipalities in MT accounted for 50% of the total soybean production of the state. Querência was the 9th larger soybean producing municipality in the state of Mato Grosso, and the 13th largest soybean producing municipality in all of Brazil (IBGE 2009, see Annex II). Moreover, according to the 2006 Agricultural Census, Querência had 126 land holdings producing 377,000 tons of soybeans over a harvested area of 121,400 hectares (IBGE, 2006). By 2010 there were close to 200 properties, with soybean production reaching 709,500 tons harvested in an area of 214,737 hectares, or 12 percent of its total area (IBGE, 2011).[6]

2) Presence of multiple landholding sizes, to ensure a cross-scale comparison of farms. Land holdings in this municipality range from small producers with less than 1ha to mega-large holdings of 150,000 ha or more. In the past decade the land distribution structure has changed considerably. The creation of four land reform settlements in the late 1990s and early 2000s by the Institute of Colonisation and Agrarian Reform (INCRA in Portuguese) with approximately 1,300 plots of 70ha to

[6] Data on number of properties from the Municipal Ministry of Agriculture and Environment, Querência.

100ha, and a dynamic land market, have unquestionably changed the land distribution structure.[7]

3) Existence of contesting, confronting or conflictive farming styles and farming systems. This was seen in the history of land colonisation by migrants from the south of Brazil and more recent migration from other regions of Brazil. Moreover, there are two rural unions, one representing the *patronal* (employer) farmers and the other the rural workers and family farmers; there are two indigenous territories, and there are farmers involved with agroecological farming.

Querência is a relatively recently colonised area; in this sense it can be considered an agricultural frontier. Although there had been previous distributions of large holdings in the area, the colonisation by farmers from the south of Brazil started in 1985 (see Chapter Four). This differentiates it from other soybean production municipalities within Mato Grosso where soybean has been planted for over three decades. The economic activity in Querência had been mainly based on cattle and timber, until the mid 1990s when soybean started to be planted, and since then it has expanded exponentially. Querência therefore exemplifies the dilemmas occurring in the soybean, agricultural frontier regions where land conversion, land use and rural development are highly contested processes.

Of the eight municipalities visited, all fulfil the three broad criteria. Two differences made Querência the site of choice.[8] First, its location: it is relatively distant from fully established infrastructure and within the Amazon biome. The other municipalities are on better connected trading routes in the *Cerrado* savannah ecosystem. Second, it had a higher incidence of land reform projects – five LRS – and a history of small-scale farming in the north-east of MT. The other sites all had some small-scale production, but only one or two LRS.[9] Table 2.1 presents further information that made Querência an ideal case to illustrate the wider dilemmas.

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[7] There is also an informal settlement in the south of the municipality, known as Canan, but by 2010 this was not officially recognized as LRS, as the land dispute had not yet been solved (Interview with Olmar Goldon, president of the rural workers union in Canarana, 24-Nov-2009)

[8] The relatively scarce literature on Querência was also a consideration in choosing a research site, as this would then be a contribution to knowledge

[9] During the visits to each municipality I made contact with both the rural unions and the rural workers unions, giving me the chance to visit soybean producers and LRS. It was observed that family farming, as

Table 2.1: Information on Querência gathered for selection of location

Migration history (type of colonisation, private or public)	A history of both public and private land reform settlements.
Size of land ownership (distribution)	Ranging from 1 hectares to a few with more than 10,000 (including one with more than 150,000 ha)
Involvement in "clean soybean" initiative	Presence of Embrapa experiments on iLPF and the I Ikatu Xingu Campaign
Use of no-till agriculture[2]	Widespread adoption of semi-till farming[2]
Presence of public nature reserves or indigenous territories	Two indigenous territories – Xingu Indigenous Park and Wawi Indigenous Territory. 40% of the total area of the municipality.
Presence of land reform settlements	Five land reform settlements – more than 1260 holdings – 6% of the total area of the municipality (105.000 hectares), but a large percentage without established settlers [1]
Connectivity to the trading and processing system	Access to trading routes via dirt road and recently paved (2011) road. Presence of six main grain trading companies (ADM, Cargill, Bunge, Louis Dreyfus, Grupo A. Maggie and Caramurú)
Representation of both Brazilian farming unions	Presence of Rural Workers Union and the Rural Union representing the *patronal* sector

Notes: [1] Corrêa 2000, p.17, [2] See Footnote 23. Source: elaborated by the author

During the six months in Querência an ethnographic study of eight farms was carried out. First, six soybean farmers across scales – small, medium and large – were chosen with a stratified random selection from a list of soybean producers in Querência, provided by the municipal Rural Union. Second, two agroecological farming cases were selected through suggestions by an advisor of the municipal ministry of agriculture and the president of the land reform settlement association. These two farmers were known to grow a variety of crops.[10] Finally, a mega large-scale farm – of over 80,000 ha – owned by Grupo André Maggi (Villela 2005) was selected due to its high profile within the soybean agri-food systems of Brazil. In the case of the mega large-scale farm, the research was carried out through semi-structured interviews and secondary sources.[11] In

a project driven by small-scale farmers, was being politically and economically negotiated in all eight municipalities.

[10] In Chapter five one of the two cases of agroecological farmers has been left out, I decided to presents only cases of farmers that have been involved in soybean production at some point in their life.

[11] A two weeks stay at Tanguro Farm was not possible due to time and the difficulty of securing access to the persons who would give permission. It was only at the end of my fieldwork in MT that I was invited

the other cases, an average of two weeks was spent doing participant observation with each of the eight families. This involved an initial interview, two semi-structured interviews, transect walks on the properties, spending time with the farmers and their families, chatting with and interviewing labourers, and an actor-network mapping exercise for each case.

During these visits, socio-environmental, socio-technical and socio-economic aspects were explored, focusing on studying farming practices and the farmers' views on the controversies raised by narratives, particularly the sustainability of soybean production and the farmers' relations to it. Often sensitive topics were raised, for example the illegality of forest clearing, labour working conditions and payment arrangements, land concentration, and negative opinions of particular social groups. These controversial topics were approached sensitively, allowing interviewees to present their views. Both men and women were interviewed. However, due to the socio-cultural characteristics of most households, with men being the 'head', many discussions were referred to the husband. Finally, the anonymity of the farmers is maintained by changing their names and by not revealing certain information that would identify them.

The classification of small, medium, and large-scale was based on the available statistics of land distribution.[12] Small-scale was taken as 100ha or less; medium between 100 ha and 1,000 ha; and large was above 1,000 ha. As shown in Table 2.2, the distribution of holdings per area in Mato Grosso would be of 6% smallholdings, 51% medium-scale holdings, and 42.9% large holdings.[13] This distribution suggests the existence of multiple farming styles. These statistics reflect that, although a small percentage, there was small-scale production of soybean in 1995/1996. Moreover, they show a high land concentration (with holdings of more than 1,000 ha representing 77.7% of the total area of soybean production), but medium-size holdings have a considerable numerical presence in terms of the absolute number of holdings (51%). Therefore the cases were selected across the range of land holding sizes.

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to visit the farm, when I interviewed João Shimada, the Corporate Environment Supervisor of Grupo André Maggie, in Cuiabá. But I was able to go back to Querência and visit the farm for a day in June 2013.

[12] The statistics presented in Table 2.2 correspond to the 1995/96 IBGE census which is carried out every ten years. The 2005/06 census, available until 2009 does not offer the same data

[13] From the current available data from the new census it is not yet possible to reproduce a table with the distribution of number of holdings and area per plot size.

Table 2.2: Distribution of soybean holdings according to farm size in Brazil and MT (1995/96)

		Brazil		Mato Grosso	
Plot size hectares		Holdings	Area (ha)	Holdings	Area (ha)
Total	Number	242,999	9,488,081.8	2,746	1,740,391.8
	Percentage	100	100	100	100
Up to 100 ha	Number	214,351	2,532,177.4	166	5,443.5
	Percentage	88.2	26.7	6.0	0.3
100 to 500	Number	20,635	2,437,870.8	822	144,182.8
	Percentage	8.5	25.7	29.9	8.3
500 to 1.000	Number	4,078	1,321,949.4	579	238,872.1
	Percentage	1.7	13.9	21.1	13.7
1000 to 5.000	Number	3,492	2,315,867.6	981	846,761.7
	Percentage	1.4	24.4	35.7	48.7
More 5.000	Number	443	880,216.6	198	505,131.6
	Percentage	0.2	9.3	7.2	29

Source: IBGE, CensoAgropecuário (1996), adapted from Castrillon (2007)

Each cases´s actor-network map supported the subsequent tracing of their respective networks. During the participant observation period in each household, the farmers were asked to identify the people and institutions to which they relate throughout the year in running their farms. To facilitate the identification of these relationships four main topics were examined: 1) access to farming inputs; 2) access to knowledge; 3) policies and organisations in which they are involved; and 4) actors with whom they trade their production. The map was then discussed in a semi-structured interview to uncover further aspects of the relations and dynamics of farmers within their actor-network. This method resulted in a broad list of actors to be interviewed in Querência as well as other localities in Mato Grosso. Furthermore, it provided a list of policies which farmers are associated with or affected by, and about which they have opinions that reflect their framings of particular farming and sustainability narratives. This list was then used to interview people involved with the implementation of the policies at different levels of the government.

This network mapping involved 58 interviews with people representing corporations, government institutions, and NGOs, or who were related to policies identified by the farmers. These interviews were in Querência, seven other municipalities in MT (including the capital Cuiabá),[14] and in two cities in Brazil (Brasilia and São Paulo).

[14] Other than Querência interviews in MT took place in Barra do Garças, Agua Boa, Xavantina, Canarana, San Felix de Araguaia, Vila Rica y Cuiabá (see annex I).

These semi-structured interviews were around the relations with farmers, involvement in Querência, views on particular policies, and specific practices of institutions in relation to soybean production. These interviews contributed to the analysis of narratives, and also gave insights into the group alliances and power relations between stakeholders (see Chapter Three). In addition to the interviews, governmental and academic institutions were visited to access secondary sources. This search for documents included a private archive in Querência owned by Gerda and Milton Eichholz. It is a small collection of local newspapers from the 1970s to the 1990s published by COOPERCANA, the cooperative that managed the colonisation project of Querência, which allows the tracing of the narratives around soybean production at the time (see Chapter Four).

This chapter presented the theoretical framework proposed for this research, having political ecology as the overarching approach, complemented with policy process analysis and the study of farming styles. In the next chapter the narratives that shape the policy debates on sustainability of soybean agri-food systems are presented and analysed. Chapter four locates Querência in terms of its bio-physical characteristics, a brief history of land distribution, and in relation to the networks of actors involved in the soybean agri-food systems. This serves as a contextualization for the study of particular farming styles in this municipality. Chapter Five presents the eight cases of farmers according to their livelihood trajectories, farming practices, and associated agrarian dynamics. In Chapter six I compare these diverse farming styles, offering an account of the dimensions –migration trajectories, patterns of capital accumulation, land use policies, and relation with labour, technology and markets – that are shaping the different farming pathways present in Querência. In Chapter seven I summarize the answers to the three main question of this research, and reflect on the contributions of this study.

Chapter 3

Narratives: diverse perspectives on the sustainability of soybean agri-food systems

Private companies, organised social groups, government ministry officials, academics and crop producers all have different views about the role of soybean agri-food systems and their sustainability. These are expressed using different means, including the newspapers, policy reports, academic articles, public presentations, in political lobbying, and even agricultural practices. Policy narratives are taken here as the main, broad stories that shape the public debate in Brazil, and the policy decisions which are currently shaping in important ways the pathways for sustainable development of soybean agri-food systems.

Two main questions guide this chapter. First, what policy narratives are currently used to frame soybean farming and the associated implications? Second, what conceptions and strategies of farming and soybean sustainability tend to dominate in policy? Three broad policy narratives can be found surrounding the debates of sustainable development of soybean agri-food systems. These are defined in this chapter as: the 'agribusiness' narrative, the 'agroecological family farming' narrative, and the 'responsible multi-stakeholders' narrative.

The first two narratives have been constructed over a long span of Brazilian history and reflect polarized and conflictive political positions (Pádua 2004). The confrontation is framed in terms of large land owners versus small scale farmers, and the advocates compete around which model of agriculture is better, whether it is the agribusiness geared to an exporting economy or the development of a peasant, family farm economy (CNA 2004; 2010; MDA 2009). This involves even the contestation of the definition and use of the concepts agribusiness and family farming, and assessment of their socio-economic and environmental implications (Medeiros 2001; Heredia, Palmeira, and Leite 2010). However these main broad story lines are neither fixed nor99 the only understandings that influence policy processes. These are extremes of the political spectrum. On one side is the *Confederação de Agricultura e Pecuária do Brasil*

(Agriculture and Livestock Confederation of Brazil - CNA) defending the *latifundia* (large land ownership) under the banner of productive agribusiness, and on the other side the *Movimento Dos Trabalhadores Rurais Sem Terra* (Movement of Rural Landless Workers - MST) exerting political pressure for further land reform in favour of small-scale farming.

The dominance of the agribusiness narrative and related interest groups has been questioned in relation to the rising concerns with the environmental challenges to agriculture and rural development. This has implied a contested process to define sustainable agriculture and shape policy accordingly. The advocates of small-scale agriculture have found in agroecology a strong metaphor that can guide policy for ecological family farming (von der Weid 2006). The advocates of large-scale, agroindustrial agriculture organized as agribusiness tend to respond adversely to environmental challenges, but political as well as ecological pressures have led them to find responses. This has led some of the agribusiness advocates, as is the case of Blairo Maggi (see Chapter Five), to integrate a sustainable agriculture narrative and influence environmental policy on their own terms (Saito and Azevedo 2010).

The third narrative has been shaped by national and international environmental groups, such as Greenpeace, WWF, and ISA, which have created spaces for negotiations and alliances in the last decade to break a political impasse and find ways of making agricultural production compatible with environmental conservation (Guerin and Isernhagen 2013). Although this narrative is linked to environmental socio-political mobilizations of the past, and the groups that embrace it have shared perspectives with advocates of family farming, there have been changes in the content of the policies they advocate for and have created new alliances with groups that are associated with the agribusiness narrative.

In this context of multiple narratives the framing of who, why, and how soybean is produced and what its socio-economic and environmental implications are is part of the broader politics to shape development policies and the way farmers farm. The three broad narratives are discussed here according to: first, their different notions of farming styles and agricultural models, highlighting the ways the scale of farming is considered; second, their story of the expansion of the soybean agroindustry and its environmental

and social implications; and third, conceptions of sustainability and the initiatives proposed for a sustainable soybean agri-food system.

Agribusiness Narrative

The agribusiness narrative comes from groups that support the advancement and increase of soybean production on the basis of technological innovations and incremental management improvements. It underlines the economic benefits soybean production brings to each country and reduces social and environmental effects to problems that can be solved with technical and/or policy solutions. Its main advocates are machinery production companies, like John Deere and Case IH; grain trading corporations and processing agroindustry such as ADM, Bunge, Caramuru, Cargill, Grupo Maggi, and Louis Dreyfus, which form the *Associação Brasileira das Indústrias de óleos Vegetais* (Brazilian Association of Vegetable Oil Industries - ABIOVE) and the *Associação Brasileira do Agronegócio* (Brazilian Agribusiness Association - ABAG); as well as the farmers' unions *Associação dos Produtores de Soja do Estado de Mato Grosso* (Mato Grosso Soy and Corn Growers Association - APROSOJA) and the *Confederação de Agricultura e Pecuária do Brasil* (Agriculture and Livestock Confederation of Brazil - CNA). These actors are collectively involved in the industrialization of agriculture in Brazil and the formation of global value chains, and act to lobby the government to advance their agendas and modify policy to their advantage. They have a strong influence in the Ministry of Agriculture, Livestock and Food Supply (MAPA in Portuguese) and with the *Ruralistas* (rural oligarchy) congress group which advocates against the agrarian reform and in favour of agribusiness (Carneiro 2008).

This narrative has the modern commodity producer as the key farming figure. A farmer stands in the middle of a green field, with the soybean ready to be harvested; he receives on his mobile phone the last agri-news of the day, the last price quotes from the Chicago commodity market, and the multinational grain trader's local price. Meanwhile his several recently-bought combine harvesters, clean and shiny, are operated by highly trained drivers who receive satellite directions from a GPS, and raze stripes of soybean field 15 metres wide. Also in the picture are the farmer's children, a boy and a girl

playfully running around him. This is the stereotypical farmer that appears in agribusiness product materials and the one that is usually portrayed as the modern soybean producer. Indeed, for agribusiness this large-scale producer represents the successful farmer who moved in search of larger areas from the south of Brazil to the centre-west, particularly Mato Grosso, where 40% of the farms are of 1,000 to 30,000 hectares or more (APROSOJA 2010, 17).

However, in this narrative, the existence of this modern farmer is becoming obsolete due to the recent trend of larger-scale corporate farming. Now it is multinational corporate groups with higher capital investment, producing on even larger landholdings, and using state of the art technology, who can succeed in making the Brazilian agribusiness competitive in the world market. Therefore, "smaller farmers are trading tractor seats for swivel chairs, allowing them more time to manage risk and make better marketing decisions. Many are turning their farms into corporate entities, which gives them access to cheaper credit" (Economist Intelligence Unit 2010, 6). This new trend is the continuation of the story of increasing scales of production that have made soybean farmers competitive producers (EMBRAPA Soja 2004).

It is this agribusiness that has made Brazil a major producer and exporter of world traded agricultural products, such as coffee, oranges, sugar, beef, soybean, poultry meat, maize, milk, grapes, pork and cotton (APROSOJA, 2010). The success is sustained by the mechanisation of the production process, adoption of technological advancements, economies of scale, available land, professional farm management, a competitive processing industry, and partnerships between producers and the agroindustry (Lazzarini and Nunes 1999; Goldsmith and Hirsch 2006; Lovatelli 2009). The case of soybean is the exemplar of this success, as it puts Brazil in the league of the three major producing and exporting countries. In 2011/2012, Brazil, the USA and Argentina together accounted for more than 80 percent of world soybean production, and shared 88 percent of the world export market (40% Brazil, 40% USA and 8% Argentina, USDA 2012). This agribusiness gives Brazil the status of a powerful global competitor (Economist Intelligence Unit 2010) and the potential to feed the world (Bunge 2007a).

As a whole, agribusiness in Brazil registered in the 2000s an average of 25 percent of GDP (APROSOJA 2009, 30). Indeed, soybean is considered a key crop in

agroindustry's economic contribution to the country. This commodity is seen as the *carro chefe* (leading crop), driving dynamic agroindustrial development and setting the technological patterns in Brazil and its neighbouring countries, Argentina, Bolivia, Paraguay and Uruguay (MAPA 2007). The economic dynamism of the soybean agroindustry in Brazil is illustrated by various indicators: 1) the increasing production and productivity over the past four decades – soybean production went from 1.5 million tonnes in 1970 to 59 million tonnes in 2007, and the productivity from 1,140 kg/ha to 2,489 kg/ha (Dall'Agnol et al. 2007, 2); 2) its contribution to the balance of trade (Lazzarini & Nunes 1999, 197) – by 2005 the exports of the soybean agroindustry totalled US$9.5 billion, 8% of the total exports of the country (MAPA 2007, 66); and 3) its effects on development of towns, and its contribution to a high Human Development Index (HDI). The geographical dispersion of soybean production has involved the formation of urban centres in which the soybean agribusiness, it is argued, has generated improvements in education and health (Goldsmith and Hirsch 2006; APROSOJA 2009). To support this claim, lists of municipalities from the *Cerrado* regions with a high incidence of soybean production are shown to correlate with lists of municipalities with HDI above the 2002 national average of 0.775 (Lovatelli 2009, 18).[15]

Brazil has been able to increase its soybean production by managing its resources and taking advantage of its biophysical conditions. As APROSOJA claims, "the great amount of available arable land [approx 30 million hectares of virgin area for agriculture] along with a great rainfall level [12 percent of world´s fresh water, regular rainfall and stable temperatures] gives Brazil an unbeatable combination" (2010, 9). Increased soybean production in Brazil is told as a story in which enthusiastic farmers from the south of Brazil – where land fragmentation was making the small agricultural properties economically unviable – migrated to the *Cerrado* region, in the centre-west. The land was cheaper in the new frontier of colonisation, the government promoted its colonisation with economic incentives and the construction of infrastructure, and there were technological advances – such as adaptation of soybean varieties to more tropical

[15] There is a debate around the actual implications of the soybean agroindustry for living standards in the production regions, particularly in terms of the distribution of benefits among the population. As pointed out by Wolford (2008) and Barrozo (2009), most of these urban centres also have people living in shanty towns and inferior living conditions, an aspect that is not captured by the HDI. Other studies have argued that soybean production could be reducing poverty but creating inequality (Weinhold et al. 2010).

latitudes, correction of savannah soils with limestone, and using the *Rhizobium* bacteria to fix higher nitrogen levels in the soil[16] – that made soybean production possible and increased productivity in this *Cerrado* savannah.

The process of occupation of new areas is seen as one of making empty areas productive. In this sense, Brazil is identified as a country that has sufficient land available to increase soybean production and therefore is in a favourable position to consolidate and advance its agricultural frontier (MAPA 2007; APROSOJA 2010). Indeed, land being a relatively cheap resource is considered an essential factor in farmers' competitiveness. From this narrative perspective, the extension of the agricultural frontier is unlimited, and the vast areas in which the soybean agroindustry is present are assumed to develop equally.

This story of success, however, is considered to be facing limitations to its continuous advancement. To cover the expected future increase in demand for soybean (MAPA 2007; S. R. Pereira 2004, 28) three bottlenecks are generally championed:
1) Further investment in infrastructure is required. It is argued that farmers from the centre-west with large properties, highly-qualified labour, and the best technology to maintain the highest productivity, face high transport costs that jeopardise their competitiveness (APROSOJA 2010). To overcome the distance to the ports there has to be better maintenance and expansion of roads; increased storage facilities; a shift in the mode of transportation towards having a larger carrying capacity and lower overhead costs; strengthening infrastructure for waterway and railway transport; as well as improvements to port infrastructure (Schnepf, Dohlman, and Bolling 2001; Lovatelli 2009; APROSOJA 2009).

2) The percentage of processed soybean exported has to increase, to augment the added value received by the Brazilian agribusiness. This requires increasing the processing capability of the agroindustry in the country. Argentina is taken as a reference, as 80% of its exports are "in the form of higher-valued soybean meals, rather than raw soybeans", while in Brazil around half of its exports are in the form of raw soybeans (Goldsmith & Hirsch 2006, 100). It is considered by some that increasing processed

[16] Personal communication by John Landers.

exports will enhance the economic benefits that the soybean agroindustry brings to the economy, therefore making it more sustainable (Lovatelli 2009).

3) Improvements are needed in the management of farms and their interconnectivity with other parts of the agroindustry. A modern agroindustry requires farmers that are well informed of the latest technological advancements and market dynamics. It is argued then that farmers need to adopt better agricultural practices and adapt to the demand for managerial abilities to run corporate farms (MAPA 2007; Economist Intelligence Unit 2010).

Within the agribusiness narrative the environmental challenges for sustainable development are not major obstacles for the continuation of the current trends of development of the soybean agroindustry. However, it is recognised that some adjustments have to be made. The increase in soybean production in Brazil, the narrative suggests, will come from increasing areas and increasing productivity through best agricultural practices. Rather than expanding into new areas, the main increase is expected to come from conversion of degraded land and "low productivity pasture" (Mueller 2003; Brandão et al. 2006; APROSOJA 2009, 58). As argued by APROSOJA, "Brazil has the potential to more than double its grain area just by converting current pasture land" (2010, 10).[17] This is supported by the "hypothesis [...] that conversion of degraded pastures, not virgin areas of Amazon forest, was the main source of land for the recent expansion of soybeans acreage" (Brandão et al. 2006, 9). It is also highlighted that "in 2007, only 0.2% of the total Amazon Biome area was planted with soybean" (APROSOJA 2009, 54)[18] and that only a limited area of the Amazon is suitable for soybean production.

> Agriculture and cattle raising have a better chance of economic success in the so called *Amazônia seca* [dry Amazon] (17% of the area) located at the south of the *Amazônia Legal* [Legal Amazon]. In the rest of the Legal Amazon (83%), these authors [Schneider et al. (2000)] demonstrate that the best use of

[17] Of 303 million hectares of available land, 79 million are currently for crop production, 120 are pasture and 105 is virgin land of which "approximately 70%" has to be kept as Legal Reserve (APROSOJA 2010, 10)

[18] The figure of 0.4% is mentioned by ABIOVE citing IBGE as their source, but no year is given for the statistic (ABIOVE 2009, 38). The APROSOJA document cites Embrapa as their source. Neither of these organisations give the full citation of the sources.

> land is forest management (Mueller & Bustamante 2002, 5, author's translation and italics added)[19]

Therefore, environmental effects of soybean on the Amazon forest and the *Cerrado*-savannah are not viewed as a threat (Brandão et al. 2006; APROSOJA 2009b).

This narrative is translated into a particular view and practices by soybean producers (see Chapter Five; Azevedo and Pasquis 2009; Brannstrom 2011). As expressed by some farmers in Querência, the production of soybean has a historical as well as a socio-economic justification, "the government gave incentives to come and occupy the unproductive areas, now they want us to stop, but what are we going to live off? If we stop producing what are people in the city going to eat? They like meat, no?"[20] Moreover, some of them already see environmental activities in their practices, and therefore reject the pressures for changes in their procedures, "we are the first ones to care for the environment, we are the ones preserving the riparian areas for the fauna and flora, and keeping the rivers clean."[21] "Look what they have done in the cities where environmentalist live? Where is the riparian area and clean water in the Tieté River in São Paulo? That is a polluted river."[22] For these farmers the production of soybean has a trajectory of sustainable development, based in technical changes and the farmers' own care for the resources that allow long-term production and a competitive agro-food system.

The general framing of sustainable development' by agroindustry is focused narrowly on intensification of production. As advocated by APROSOJA's CEO Marcelo Duarte Montero "Increasingly, land use [in Brazil] will be intensified, and pasture areas will be converted into high tech crop fields" (APROSOJA 2010, 11). This intensification is

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[19] Studies of the expansion of soybean and its impacts refer to the Amazon with different terms. Legal Amazon and Amazon Biome are the most common. The first is an administrative term that comprises nine Brazilian states - Acre, Amazonas, Roraima, Amapá, Pará, Rondônia, Mato Grosso, Tocantins and Maranhão – totalling 5.1 million km². The second refers to the Amazon forest excluding *Cerrado* areas and comprises 4.2 million km² (Bunge 2007, 1). Moreover the mention of "17%" dry Amazon, in the southern part of the Legal Amazon, presumably refers to the transition area; however Muller and Bustamante (2002) do not specify this. Brandão et al (2005, 22) argue that the transition area should be distinguished from the "dense" Amazon forest, as this transition area - called also "Nortão" in reference to the 'great north' of Mato Grosso - resembles the *Cerrado* more. The definition of the transition area and its classification is disputed (see Chapter Four).

[20] Interview with Lorenzo, Querência-MT, 10th February, 2010 (see Chapter Five).

[21] Informal talk with Fernando Gorgen, Querência´s mayor (2005-2012) and large-scale soybean producer (>10,000 ha), while drinking mate with other soybean producers, Querência-MT , 13th, February, 2010.

[22] Ibid.

seen as the path to be taken to reduce pressure over the Amazon and *Cerrado* ecosystems. Moreover, the intensification of production involves further increases in productivity, restoring degraded land, further adoption of no-till farming, genetically modified organisms, double cropping rotation, iLPF, and precision agriculture (APROSOJA 2009b; ABIOVE 2009). These agricultural practices are recommended as environmentally sound. In particular, no-till farming in Brazil is considered as a widespread farming practice critical for soil conservation and operational cost reduction, which has brought considerable changes in soybean production (Pieri et al. 2002; Landers 2005).[23]

In recent times, some of the corporate groups, such as Grupo Maggi, members of ABIOVE, and Rabobank, have engaged with environmental NGOs in corporate social responsibility initiatives, such as the Round Table for Responsible Soybean (RTRS), or have created their own environmental and social initiatives. These are intended to include environmental and social concerns in the decision making of the soybean agri-food actors. While some of these initiatives barely take distance from the core logic of the agribusiness narrative, others reflect a different understanding of the soybean agro-food system, its environmental and social implications, and how sustainable development should be pursued. This agenda is developed as part of the responsible multi-stakeholders narrative presented below. However, in Brazil the agribusiness narrative has historically been counteracted by advocated of an alternative view of farming and rural development. This position is revised next in relation to the debates of soybean as the agroecological family farming narrative.

Agroecological Family Farming Narrative

The agroecological family farming narrative is supported by groups that are highly critical of the mechanised monoculture model of soybean production for export– a strategy that is deemed incompatible with sustainable rural development (Carvalho

[23] No-till farming, or conservation agriculture, is an agricultural technique of planting year by year without tillage. In Brazil when using *plantio direto* (no-till farming) soybean is planted on covertures of desiccated pasture, or other green covertures, to protect the soil from erosion and increase water retention. Farmers all around Brazil have organised the *Clube Amigos da Terra* (CAT, Friends of the Land Club) to promote, in association with other research and commercial institutions, the use of this technique (Landers 1999). However the wide diffusion of this technique has also involved adaptations by farmers, such as doing a minimum tillage, or semi-direct farming, which reduces the technique´s ecological protection of soil and therefore the sustainability of the production (Séguy and Bouzinac 2008).

1999; Fearnside 2001; D'Avila 2003; Schlesinger and Noronha 2006; Steward 2007; Friends of the Earth 2010; Repórter Brasil 2010). The concerns and criticisms are centred on multinational agribusinesses that are considered to be promoters of the monoculture technological package – including GMOs – and a model of development which exacerbates inequality and causes environmental degradation (Carvalho 1999; Bickel 2005; The Dutch Soy Coalition 2006; Schlesinger 2006; Friends of the Earth 2007). The advocates of this narrative have a shared understanding that soybean represents a threat to ecosystems (Carvalho 1999; Smith et al. 1999; Fearnside 2001) as well as to alternative models of rural development and farming (Schlesinger & Noronha 2006; The Dutch Soy Coalition 2006). It is argued that restrictions must be placed on further expansion of soybean, and corporate agribusiness as a whole. Instead, the advocates of this narrative voice their support for smallholder agriculture and agroecological production as an alternative (Petersen 2009).

Proponents of this approach associate large-scale production of soybean with land concentration, unequal trading arrangements, low employment creation, marginalisation of small-scale farming and indigenous populations, reduction of food availability at the local level, negative health effects related to the use of agrochemicals, devastation of various ecosystems, loss of biodiversity, soil degradation, water pollution, and contribution to anthropic climate change (Schlesinger 2006; Arvor et al. 2010; Glass et al. 2011). They claim that these processes are taking place in all the Latin American countries where soybean expansion is occurring, including Argentina, Uruguay, Paraguay, Bolivia and Brazil (Gudynas 2006; Rulli et al. 2007).The advancement of soybean production is interpreted as a threat to the *Cerrado* and Amazon forest in Brazil, and the *Chaco* and Atlantic rainforest in Argentina, Paraguay and Bolivia (Shiki 2000; Gudynas 2008). From this perspective, farming activity has effects not only at the farm level but also at the level of ecosystems and even the global climate system.

In the agroecological family farming narrative two conceptions of farming are contrasted. On the one hand, the large-scale corporate-owned farms with 1,000 ha to 50,000 ha or more; and on the other, small-scale farms of 5 to 50ha (The Dutch Soy Coalition 2006, 17). The large-scale farming model – mechanised and capital-intensive – is oriented towards a commodity export economy. In contrast, small-scale farming has the potential to produce crops ecologically more suited to the countries' consumption,

and generate a more socially and economically just development (Altieri and Pengue 2005; GRAIN 2006; Petersen 2009; Altieri and Toledo 2011). In the case of soybean expansion, a major concern is that large-scale soybean farms managed by private firms are displacing small-scale farms, or family farms. As well as this displacement, the expansion of soybean production is associated with other socio-economic effects, such as low employment creation, slavery, illnesses caused by the use of agrochemicals, land conflict, and human right violations (Bickel 2005; Glass et al. 2011) and lately land grabbing (Baletti 2011; Oliveira 2013). In contrast to the large-scale producers, soybean family farmers are seen as the most vulnerable actor in the value chain, due to undercapitalisation, dependency on multinationals, and the marginal attention it receives in agricultural public and private policies (Galinkin 2002; Bertrand and Théry 2004; Arvor et al. 2010).

The discussions around deforestation in Brazil and the controversy surrounding the process of deforestation are now firmly in the public realm (GT Floresta - FBOMS 2004). Soybean production is often seen as one of the main contributors to deforestation of both the Amazon forest and the *Cerrado*-Savannah. Deforestation is attributed to the rapid expansion of this crop, be it due to direct land clearances or because of indirect processes of infrastructure expansion and expulsion of other agricultural activities to new land (Fearnside 2001; The Dutch Soy Coalition 2006; Glass et al. 2011).

From the perspective of this narrative the rapid increase in soybean production is driven by the increase in global demand for soybean (Arvor et al. 2010). The soybean agroindustrial system is seen as an interconnected chain in which producers' decisions are affected by events elsewhere (Gudynas 2006). The main factors that cause a higher demand for soybean are the changes in patterns of consumption to a more meat-based diet in developing countries – mainly China; the replacement of animal feed for vegetable feed, especially in Europe; and more recently the increasing use of soybean as biofuel (Repórter Brasil 2010). This rapid increase in demand for soybean feed is seen as a worry as it will require an increase of soybean supply. Citing FAO, Schlesinger stresses the worry that "the increase of production of meat to cover the demand will have to concentrate […] in Brazil and China, 33% and 10% of the increase of global production till 2014 respectively" (2006, 29).

However, soybean production is also considered to be driven by the interest groups of the agribusiness system, rather than being a natural and inevitable process of development. This raises a concern over the lobbying and decision making power that a few multinational companies have over the government and agricultural producers (The Dutch Soy Coalition 2006; Friends of the Earth 2007). It is pointed out that the expansion of the mechanised, export-oriented model, geared to large-scale farming, has been supported and incentivised through public policy and multinational private interests (Glass et al. 2011). Four multinationals: the American trading companies Archer Daniels Midland (ADM), Bunge, Cargill and the French company Louis Dreyfus, "known as 'the ABCD', after their initials […] control a large part of the production and processing chains in the exporting and the importing countries" (The Dutch Soy Coalition 2006, 17). In Brazil these companies acquire around two thirds of the grain production; "in the year 2005, these [companies] should hold 61% of the total grain, feed and oil exports and with 59% of the internal processing [of the crop]" (Schlesinger 2006, 48). This concentration, it is argued, is exacerbated by the entry of genetically modified crops, as only five companies control 91% of their sales in Brazil (Schlesinger 2006, 46).[24] It is understood then that these multinationals and their allies are defining the terms of production and its associated export model in the country.

Furthermore, the agroecological family farming narrative portrays the quest for available land and the low cost of accessing it as another primary driver of the expansion of soybean production for export in the Southern Cone of Latin America (Fearnside 2001). The particular case of Brazil has become more controversial given that the land declared available is larger than in any other region in the world. The Brazilian Ministry of Agriculture estimates that there are between 90 - 106 million hectares of land with potential agricultural use. USDA estimates 170 million hectares of land available for crop production in Brazil (Schlesinger 2006, 29). Beyond the accuracy of this data, the family agroecology narrative expresses concern that it is taken as a justification for devoting more land to soybean for export.

The story of rapid expansion of soybean production in Brazil is seen as an example of the increasing concentration of land – and consequently power – in the hands of a few

[24] These five are Dupont, Monsanto, Syngenta, Bayer CropScience (Aventis) and Dow AgroSciences

producers, particularly corporate farmers (Schlesinger and Noronha 2006; Friends of the Earth 2010; Baletti 2011).[25] Its expansion is characterised by the increasing size of the fields in which the crop is sown. This is considered to exacerbate the negative environmental and social effects of this form of agriculture. It is argued that planting soybeans as monoculture "in large properties, use of sophisticated and large size machinery, storage and export infrastructure are factors that make small producers migrate to other regions and sell their lands to those that have more capital" (Carvalho 1999; Schlesinger 2006, 40). In the case of Brazil the land concentration process leads to stark geographical differences in production patterns, with small and medium soybean farms mainly concentrated in the south while the large and mega-large farms are in the midwest and northwest (Schlesinger et al. 2008; Petersen et al. 2009). Nevertheless, Schlesinger argues that "official data indicate that – even with all the increase of the soybean monoculture in large properties – family agriculture still accounts for almost a third of soybean grains production" (2006, 10). Therefore the policy bias towards large-scale production is detrimental to these small-scale producers.

Another criticism of the large-scale production model is that it is increasingly less intensive in labour and more intensive in capital (Kohlhepp and Blumenschein 2000; Vankrunkelsven 2007), which is considered to affect rural employment negatively and cause excessive migration to urban areas. It is calculated that in the large *fazendas* (farms) of the midwest, north and north-east – in both the Brazilian *Cerrado* and Amazon forest – the average employment rate is ten workers per thousand hectares, typically four permanent and six temporary workers (Whyte et al. 2004 cited by Schlesinger 2006, 43). This criticism is related to the broader process, intensified in the past two decades, to elevate family farming in Brazil to a distinct category targeted by public policy (Medeiros 2001; Wilkinson 2000; Buainain, Romeiro, and Guanziroli 2003).[26] In this policy process labour became a key factor for differentiating styles of production between *agricultura patronal* (corporate farming) and *agricultura familiar*

[25] Schlesinger (2006, 34) points out that "[t]he trend of production concentration happened in both the old and the new areas. Properties with soybean areas of less than 100 hectares decreased, between 1985 and 1996, by 44.8%. On the other hand, the soybean production properties with areas larger than 1,000 hectares increased by 11% and, by 1996, became responsible for 35.1% of the Brazilian soybean production, when in 1985 it corresponded to 21.4%".

[26] The family farming law N° 11.326, of 24th July 2006, defines the family enterprise as that having the following simultaneous characteristics: a) has no more than four fiscal modules (plots size defined by region), b) uses family labour predominantly, c) income derived predominantly from activities carried out in the establishment or enterprise, d) manages the establishment or enterprise with the family.

(family farming). The former encompasses large farms and is defined as having more than two permanent labourers. The latter refers to small-scale farms that use family workers. Institutional implications of this division are analysed below for the case of Querência (see Chapters Five and Six).

Taking into account the aforementioned processes, the agroecological family farming narrative is emphatic in arguing that large-scale soybean production as currently practiced in Brazil is either incompatible with sustainability, or needs drastic transformation, in terms of both the existing socio-technical and socio-economic systems that sustain and drive it. The proposed initiatives and alternatives for this transformation are diverse. They include strengthening and expanding conservation areas intended to limit ecosystem devastation (Fearnside 2001); eliminating support to the corporate agribusiness system as a whole, strengthening land reform, and promoting organic and agroecological production to replace it (Bickel 2004); implementing further regulation and self-regulation of agribusiness, reducing areas of production and restricting trade of soybean in areas that have not been deforested (Articulação Soja – Brasil 2004); and calling on the government to acknowledge the detrimental bias against small-scale agriculture, to shift to an agroecological approach to rural development (Altieri & Toledo 2011). Moreover, it is argued that soybean for small scale production can only work in a diversified farm, ideally agroecological, to reduce dependency on monoculture, intensive use of external inputs and dependence on credit from multinational corporations (Schlesinger and Noronha 2006; The Dutch Soy Coalition and AIDEnvironment 2006; Petersen 2009).

Responsible – Multi-stakeholder Narrative

The responsible multi-stakeholder narrative comprises a diversity of views that have evolved from a process of dialogue and strategic decisions by environmental groups (NGOs) and other civil society organisations, aiming at harmonising the conservation and agriculture development agendas.[27] Their multi-stakeholder initiatives – e.g. the Soybean Moratorium and the Round Table for Responsible Soybean (RTRS) certification – see as fundamental the dialogue with and engagement of key large

[27] Some of the most well known NGOs are WWF, Greenpeace, ISA, The Nature Conservancy, Conservation International, ICV, and IPAM. These organisations act independently of each other but some also collaborate on certain initiatives.

economic actors such as multinational corporations involved in the production, processing and trading of soybean, as well as financial institutions and crop retailers (Nepstad and Stickler 2008). In recent years it has become an influential narrative, attracting supporters from the private sector, public sector and civil society at both national and international levels. Concerns about the scale of environmental and social repercussions of the expansion of soybean production on highly valuable ecosystems – such as the Amazon forest, the Brazilian *Cerrado*-savannah, and the Argentinean, Paraguayan, and Bolivian Chaco-savannah – are central to their story. They argue that better agricultural practices, compliance with current laws, and the participation of government, private sectors and civil society can transform the soybean chain into a sustainable system.

In the case of Brazil the picture that represents this narrative is a landscape seen from the sky, where both Amazon forest and agricultural fields can be observed. There is a clear line that differentiates the tropical forest from the plantation area. Ashes from the clearing process are still visible and the tracks of large machinery make a uniform pattern on the cleared red soil that contrasts with the many shades of green in the forest. This picture represents the encroachment of the soybean agroindustry into the Amazon forest (Rohter 2003; Lilley 2004), considered the last forest frontier in Brazil (Pasquis & Vargas 2010; Greenpeace 2006). The advancement over the "largest forest in the world" has become a matter of international concern, as its deforestation is associated with large scale ecological implications that affect water cycles, biodiversity dynamics, and release of carbon dioxide into the atmosphere (Pasquis 2006). Although the Amazon forest has captured the greatest interest of the media, NGOs and even policy makers, it has been pointed out that there have been considerable adverse environmental implications on other complex and dynamic ecosystems, such as the Brazilian *Cerrado* (Mueller 2003; Machado et al. 2004; Klink and Machado 2005)

This narrative shares with the family farming narrative the general story of the expansion of soybean in Brazil and the view that this has caused negative environmental and socio-economic effects. These narratives recognise the driving force of international factors, and specify that particular policies have been put in place to benefit this expansion. The beginning of soybean expansion in Brazil can be traced back to the 1940s when the government "started promoting the cultivation of soy to become self

sufficient in vegetable oils" (Dros 2004, 9). However, it was not till the 1960s and 1970s that soybean production started to increase rapidly, motivated by the increase in demand for soybean feed with the collapse of the Peruvian anchovies industry (Greenpeace 2006, 49). It was then that "large scale, fully mechanised soy farming (farms ranging from 300ha to 10,000 ha) became the dominant production practice in Brazil", as well as Argentina, Bolivia and Paraguay (Schnepf et al 2001 in Dros 2004, 7). By the 1990s, the demand for soybeans was still rising due to: the increase in world population and meat consumption; the restriction on animal feed as a response to the 'mad cow' (*bovine spongiform encephalopathy,* BSE) outbreaks in Europe that led to increased European demand for vegetable feed (WWF-Brazil 2003); and the devaluation of the Brazilian currency, "which greatly increased the competitiveness of all Brazilian commodities in the world markets (Kaimowitz et al. 2004, Nepstad et al. 2006)" (Nepstad and Stickler 2008, 47). All facts that contribute to an understanding of soybean production as interrelated with international factors, particularly that of world demand as driver of change at the farm level. A crucial aspect of this narrative is to see international certification as a mechanism to incentivise changes within soybean agri-food systems.

In contrast to the family farming narrative – highly concerned with the concentration of wealth and power – the responsible multi-stakeholder narrative emphasises instead the speed and magnitude of expansion of soybean production, which is seen as a threat to the various ecosystems in Latin America (Dros 2004).[28] As Greenpeace states:

> "[i]n 2005, Brazil added the soybean to the list of export commodities in which it leads the world (Morais 2005). In 2004–05, Brazil produced over 50 million tonnes of soy across nearly 23 million hectares, an area of land about the size of Great Britain." (Greenpeace 2006, 13)

This expansion of soybean production in Latin America is associated with the government's support for the 'Green Revolution' technological package to encourage the production of export crops, and increase the flow of foreign currency to pay international debt (Dros 2004; Pasquis and Vargas 2010). However, the responsible

[28] Jan Marteen Dros cites the following ecosystems with soybean production by region. In Argentina: Atlantic Forest, Chaco and Yungas. In Bolivia: Chiquitano Forest and Chaco. In Brazil: Transitional and Rainforest Amazon, and Cerrado. In Paraguay: Atlantic Forest and Chaco (Dros 2004, 49)

multi-stakeholders narrative acknowledges that this trend has involved multiple actors, from government officials, a "critical mass of professional farmers", extension service technicians and agronomists, to inputs dealers, small commodity traders, and corporations and bank executives. All "collectively working to ensure this [large-scale production of global cash crops] happens" (van Gelder & Dros 2002; USDA/FAS 2004 in Greenpeace 2006, 17). An aspect that contributes to the conception of multi-stakeholder initiatives promoted by this narrative.

The responsible multi-stakeholder narrative sees agribusiness actors as the main drivers of the expansion of soybean production, which involve also the whole range of commodities, including rice, wheat, maize, and cotton, and the interlinked cattle and timber sectors. However, this narrative sees the agribusiness in a context of global competition, in which the actors capture and maintain large shares of the increasing world demand for food commodities (Pasquis and Vargas 2010). Richard Pasquis describes the strategy followed by the Brazilian soybean agroindustry as a "combination of the reduction of production costs, the increase in productivity, and the externalisation of environmental and social costs" (2006, 49). The logic of reducing the cost of production through economies of scale to become competitive has given the soybean agroindustry economic advantages in the global market, and brought substantial monetary flow to the national economies. However, this has had significant, negative environmental and social effects that are not only undesirable but also pose a threat to the sustainability of the agroindustry itself (Dros 2004; WWF-Brazil 2003). In this view there is a recognition of economic benefits for the country, and an association of large-scale production to a strategy of competition based on economies of scale, while the main concerns are on aspects that render the agroindustry environmentally unsustainable.

The responsible multistakeholder narrative considers that large-scale farming has become the dominant soybean production system, and therefore one to be regulated and changed. Although Brazil is seen as an exception in which smallholding farms still produce a significant percentage of soybeans; "[…] this share was about 30% in 1996,

and is estimated to have declined to 15-20% in recent years"(Dros 2004, 9).[29] The decline in their participation is associated with the functioning of the soybean agroindustry and considered a trend that creates further pressure on ecosystem frontiers.

> Between the fall of the value of the final product and the increase in the costs of inputs, producers are constantly forced to reduce their costs and find cheaper and more productive land, sometimes in far away regions, other times in forest areas (Galinkin 2002 in Pasquis 2006, 51)

Furthermore, the economies of scale possible with mechanisation and access to cheap land allow production cost reduction through labour cuts. Thus, soybean production becomes a low labour demand activity (Bickel & Dros 2003; WWF 2005). This is a key criticism of the large-scale soybean production system: not benefiting local communities through employment. In Greenpeace´s words:

> To profit from soya production as a global cash crop, farming must be done on a large scale. The soya industry in Brazil employs fewer people per hectare than any other crop grown across the country. Soya farms reach up to 10,000 hectares in size but employ only one worker per 170–200 hectares [Bickel and Dros 2003]. So it is not local communities who are benefiting from the soya industry (Greenpeace 2006, 17)

The other main factor that has defined the strategy of the soybean agroindustry, pinpointed by Richard Pasquis (2006), is increased productivity. The mechanisation and technological packages that were adapted to Brazilian ecosystems in the 1960s and 1970s by Embrapa and private research centres allowed increases in productivity and intensification of land use. This trend is still seen as a means to increase production; however, it is estimated that this land use intensification would not be enough to cover the expected demand without expanding the cleared area. Rather than assuming that land is available for further expansion, in this narrative the concern is to regulate further expansion. What is at stake then is the way in which this expansion will take place, and whether it will be possible to reduce environmental and social impacts through better policies and practices or whether things will stay the same (Dros 2004). Under this narrative, the series of initiatives that are taking place reflect the view that it is possible to reduce the negative implications of the soybean agri-food system.

[29] The 1996 data is from IBGE 1996, and the estimation for recent years is a personal communication from Altemir Tortelli, director of the Brazilian rural workers' union FETRAF-Sul cited by Jan Maarten Dros (2004, 9)

The role of the state in shaping the soybean agroindustry is acknowledged to be crucial in this process, yet it has been criticised for being ineffective (Stickler et al. 2013). In the case of Brazil, it is recognised that the state has put in place a series of laws and regulations intended to guide the use of natural resources and agricultural practices, but these have not been properly implemented. It is claimed that the Forest Code, regulations on the use of agrochemicals, property rights, land reform settlement programmes, and economic and socio-environmental zoning policies have not yet delivered significant improvement (WWF-Brazil 2003). Illegal deforestation and the lack of clear property rights are referred to as the main examples of failure on behalf of the government to control the process of agricultural expansion and its devastating effects on the environment (Greenpeace 2006; Stickler et al. 2013). It is argued that if the soybean agroindustry complied with the array of existing laws and public policies and that these were fully implemented by the government and monitored by civil society, that would mark a great advancement. As cited by Nepstad and collaborators from IPAM:

> Merely complying with land-use regulations in the Amazon could go a long way toward reducing the environmental impacts of Amazon soy and cattle. For example, Brazil's environmental legislation requires that 80% of the forests and all of the riparian zones on private landholdings in the Amazon be maintained as reserves, although this legislation has been difficult to enforce (Nepstad et al. 2006, 1600)

The view among many civil society and advocacy groups is that multinational corporations and the multiple actors directly involved in the soybean agroindustry have sufficient lobbying power to shape the development of the sector in accordance with their aim of expanding *commodity* production, without considering environmental and social implications (Pasquis and Vargas 2010; Greenpeace 2006). It is in this context that environmental NGOs have strategically put pressure for change and started multi-stakeholder initiatives.

These initiatives have as a central assumption that civil society organisations working collectively can enhance the implementation of government policies and make corporations more accountable and responsible for their own activities. Moreover, it is argued that environmental and social costs must be internalised as costs of agroindustry

expansion. Two main initiatives have been launched in recent years to address this accountability agenda. First, the Soybean Moratorium, is an agreement that corporations will not buy soybeans grown in Amazon forest areas cleared after 2006 (GTS Soybean Working Group 2007). The second is the international Round Table on Responsible Soy, which was established in 2006 by environmental and social NGOs, soy producers and traders, finance institutions, manufacturers, retailers and companies in the feed industry to establish globally applicable standards for the responsible production, processing and trade of soy; developing a certification system; and working to build a market for certified responsible soy. As stated by Tatiana de Carvalho, senior analyst from WWF-Brazil, in relation to the RTRS "We are aiming to have a certification available to support producers on adapting to legislation. We are working in a network to guarantee production and demand".[30] The certification system was formally agreed in June 2010 (RTRS 2010) and by 2013 there were more than a million tonnes, and 482,400 ha certified in four countries (RTRS 2013).

While critical of the concentration of economic power in a few corporations, various commentators have stated that, rather than the government, these are the first actors that must be lobbied in order to change the devastating environmental and social trends seen in the soybean sector (van Gelder and Dros 2002; Nepstad, Stickler, and Almeida 2006). Therefore, these initiatives promote market oriented and governance mechanisms within the soybean chain to transform actors' behaviours, mainly those of soybean producers. RTRS certification uses a market-based approach, based on the logic that remunerating responsible practices creates an incentive for investing in nature conservation (WWF 2005; ProForest 2005).

Groups that align with an agroecological narrative criticise these initiatives as a sophisticated form of 'green-washing' – a way for corporations to create a false green image rather than actually tackling the negative environmental effects of their intensive agricultural practices (GRAIN 2006; ASEED Europe et al. 2008). An aspect that has also created differences among the proponents of these initiatives, as it is shown with the absence of Greenpeace from the RTRS due to their rejection of the accepting genetically modified seeds as certifiable. However, what is crucial for proponents of

[30] Interview in Brasília, 12, August, 2010.

these multi-stakeholder initiatives is "to move beyond this stalemate" between producers, and environmental and social groups, and "to view the current trends and opportunities as important intermediary steps toward a future global food production system that is more benign in its environmental and social impacts" (Nepstad and Stickler 2008, 50, 53). The cases of reforestation practices promoted by ISA and IPAM – among other organization – among soybean producers in Querência, are results of these initiatives (see Chapter Four and Five).

Conclusions

Diverse views are shaping the policy debate on the development of the soybean agri-food systems in Brazil; however, three broad narratives can be identified. These have some concerns in common but differ in other fundamental aspects. Among the shared understandings is that the increase in production responds to global demands and processes, and involves the integration of producers into global commodity chains. In terms of their conceptions of farming the three narratives contrast large-scale with small-scale farming in different ways. This dichotomy is used by the actors behind the agribusiness narrative to advocate for increased economies of scale, and by those promoting the family farming narrative to underline the inequalities between farming styles and the benefits of small-scale farming. Advocates of the multi-stakeholder narrative sought to create broad-based, multi-actor platforms to build consensus towards recognizing and supporting a diversity of interests among producers of different sizes (cf. Azevedo and Pasquis 2009), but when it comes to framing farming styles it has tended to reinforce the dichotomy advanced by the two other narratives. In Brazil this dichotomy is now deeply embedded in a long historical process that today is expressed in the confrontation between the advocates of the corporate agribusiness and the supporters of small-scale family agriculture.

The particular case of soybean production appears in these narratives as the quintessential example of this confrontation between large-scale and small-scale farming. But as I will argue in this thesis, in analysing the complexity of policy processes related to the soybean sector in Brazil, this simplistic portrait of large vs. small systems takes on more nuance. The role of soybean is reduced in these narratives mainly to a commodity to be produced on a large-scale for foreign markets. But this dichotomy ignores heterogeneity of farming styles and the diverse pathways to

sustainability with which they are associated. Moving beyond this simple dichotomy may contribute to understand the multiple roles of soybean in the economy and the life of farmers operating at different scales and pursuing different farming styles.
The agribusiness narrative and the agroecological family farming narrative differ diametrically in their assessment of the implications of soybean agri-food systems for development. They also frame sustainability in different ways. The responsible multi-stakeholder narrative portrays a more balanced assessment, somewhere between the positive view of the agribusiness account and the critical take of the family farming narrative. When it comes to framing sustainability, this third narrative offers a distinct approach. According to the first narrative the soybean agri-food system in Brazil has been able to respond to the challenges of sustainability. In order to maintain the needed increase in production, farmers have to continue to adopt the new technological innovations and changes in management that have made this sustainability possible. The government and corporations would have to ensure that the Brazilian producers maintain their competitive advantage in the global market. In the second narrative soybean production in Brazil is entrenched in a deeply unsustainable agri-food system. As long as it operates in keeping with the logic of corporations and large-scale farming the negative implications would constrain sustainable development. It promotes agroecological techniques as an alternative to corporate farming. For the third narrative, conservation of ecosystems takes centre stage. Sustainability in the soybean agri-food system is coupled with practices that may reduce the pressure on ecosystems, particularly stopping encroachment into the Amazon forest.

These narratives frame the policy debate, and pitch different actors against one another, but what is the reality on the ground? To understand why policies associated with soybean take particular forms, it is necessary to assess not only the framing of issues – the narratives that tell the policy stories – but also the way policy positions become embedded in particular social networks (of actors and particular institutions and organisations) and influence their agricultural and environmental practices. Thus, in the coming chapters I will explore how actual farmers and farming practices relate to these broad narratives and how does the particular context of Querência-MT influence how these narratives are played out in practice. In Chapter four I contextualise and identify the actors that have played a crucial role in shaping soybean farming styles in Querência. In Chapter five, eight cases of farmers representing a cross-section of

different scales of production are examined to illustrate the influence of the narratives reviewed in this chapter on their farming practices. Finally, Chapter six provides a comparison of these heterogeneous farming cases to bring a more nuanced understanding of the actors, interests and processes behind the narratives.

Chapter 4

Bio-physical considerations, land colonisation , and soybean production in Querência-MT, Brazil

Mato Grosso represents the state of the agribusiness interests, the land of the large-scale producers in Brazil. It is the state with the largest soybean production (an average of 30 % of the country's total production for the past decade; IBGE 2012), where the area under soybean went from 1.5 million hectares in 1990 to 6.4 in 2011 (IBGE 2012). However, it is also seen as the state were agriculture has had the greatest negative impact (Rohter 2003; Lilley 2004). According to the Brazilian National Institute for Space Research (INPE) "40% of the Amazonian deforestation during the period 1992-2005 took place in the state of Mato Grosso i.e. 104,076 km²" (D. Arvor et al. 2010, 3190). It is in this context that the municipality of Querência is located, in a region considered one of the newest agricultural frontiers of soybean expansion in MT. The history of Querência, presented briefly in this chapter, shows how this state has been the target of multiple policies that promoted this expansion. Nevertheless, more recently the environmental concerns have been expressed in direct policies to regulate this expansion, particularly to reduce deforestation, for example the *Operação Arco de Fogo* (Arc of Fire Operation), the *Operação Arco Verde* (Green Arch Operation), and the Soybean Moratorium (MMA 2009; Stickler et al. 2013).

This chapter continues in three sections. The first section positions Querência according to its bio-physical characteristics, and some of the controversies that have arisen from differences in how the area is characterised. The second section presents the history of land colonisation as crucial to defining farming styles and the agrarian dynamics in the municipality. Four main colonisation processes can be distinguished: the creation of the Xingu Indigenous Park and Wawi Indigenous Territory, the mega-large holdings distributed by the military government in the 1960s, the Querência project of colonisation by the Cooperativa Mista de Canarana (COOPERCANA), and the creation of Land Reform Settlements (LRS). The third section is a brief description of the process by which soybean became the predominant crop, the main actors involved in the soybean agri-food system, and the initiatives affecting farming practices and

pathways to sustainable agriculture. This process includes the arrival of multinational grain traders since 2000 and the creation of institutions that form part of farmers' networks.

Querência´s biophysical characteristics and knowledge dynamics:

Usually the biophysical characteristics of a place are presented in social studies as uncontroversial. In the case of Querência, the written knowledge on its ecosystems, biodiversity, environmental services, potential uses for agriculture and so on, is still patchy. As stated by Kunz and colleagues (2010, 115; author's translation):

> The big gap in knowledge on the diversity and conservation of Amazonian plant life is that which refers to the southern portion, mostly in the state of Mato Grosso, in the area that encompasses the Xingu River Basin.

This gap in knowledge is part of the broader set of contestations playing out through the policy processes that are shaping agricultural practices and livelihood strategies in Querência. Fieldwork observation and studies of the area suggest that improving understanding of the ecosystem dynamics in the area can contribute to sustainable management of forest diversity, and help construct new socio-ecosystem relations (Lopes 2006; Kunz et al. 2010). This is exemplified by Lopes with the cases of: the vegetation in seasonal swamp areas, "popularly known as *floresta ribeirinha* and denominated as Alluvial Seasonal Evergreen Forest"*;* the "*florestas paludosas* (Ivanauskas et al. 1997), popularly known as *'mata de brejo*' in permanent swamp areas [associated to *Gleissolos*]"; and "extensive, damp fields with palm trees, popularly denominated as *Vereda*" (2006, 8).[31] These swamp ecosystems have recently become the target of reforestation policies and campaigns e.g. *I Ikatu Xingu* (ISA 2007), and promotion of agroforestry practices for fruit production and riparian areas conservation, e.g. creating a network for seed production for reforestation (Red Sementes do Xingu 2012).[32] Therefore, the biophysical characteristics of Querência are presented here considering the recent controversies over definitions and the general lack of knowledge of the area.

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[31] Corresponding to the *mata de brejos*, Corrêa mentions that the municipality has 5% of "*varjões* formations in the margins of rivers and brooks" (1999, 14)

[32] During the fieldwork the Rural Union Workers-Querência and LRS associations were involved in the formation of a small-scale agroindustry to produce fruit for pulp that could be grown in swamp areas.

Querência is found in the Valley of Araguaia in the northeast of Mato Grosso between the 52º05'0" and 53º53'0" meridians and the 11º10'5" and 13º08'5" parallels (see Figure 1.3). The region is part of the morphostructural unity of the Chapada and Planalto dos Pareci plains with altitudes ranging from 300 m to 800 m, which characterise the centre and north of Mato Grosso (Rossete 2008).Thus, Querência has a fairly flat topography, circumscribed with modest elevations. The plains of Querência extend towards the Amazon plains to the north (PNUD/MC 2005, fl. 1.3).

Querência is part of the Legal Amazon.[33] According to EMPAER (1996) the land cover in this municipality is 15% *Cerrado*, 15% tropical forest, and 70% transition vegetation (cited in Corrêa 2000). By a different classification, 79.74% of the area of the municipality is considered *Floresta Estacional Perenifolia* (Seasonal Evergreen Forest), "covering a major part of the municipality, except a zone further south where savannah formation predominates" (Rossete 2008, 59). It is a transition area, formed by ecozones and/or enclaves of the Amazon forest and *Cerrado* savannah.[34] The interaction of these ecosystems creates a zone where in certain areas the fauna and flora of one biome predominates, but in others a mixture can be found (Mendes de Oliveira, Santos, and Santos-Costa 2010; Chiavarini 2011). The IBGE classifies the area as a transition of Ombrofila Forest and Seasonal Forest (IBGE 2004a; 2004b cited in Mendes de Oliveira et al. 2010).

The transition region – between Parallels 7 and 11 – has been characterised as a region of "ecological tension" as the majority of grain and fibre production in Mato Grosso occurs in the *Cerrado* and this transition area (Magno de Melo Faria & et al. 2009, 19). This area is considered by some the best area in the Amazon for soybean plantations (Mendes de Oliveira et al. 2010). Blairo Maggi (2011b min 8), one of the largest soy producers in the world, stated that:

> The best areas [to increase soybean production in Brazil] are between the Forest and *Cerrado*, the transition area, which in Mato Grosso is 20%. These are the areas that can be incorporated [but] there is an awareness that this should be left and the focus should be on degraded areas

[33] See footnote 17
[34] *Ecotonos* (Ecozones) refers to the transition between two biomes.

The official definition of Querência as a zone within either the C*errado* savannah or the Amazon forest has created controversies and political tension. Many soybean producers claim their land is savannah (as registered in early official land registration documents held by them), and strongly deny the existence of dense Amazon forest on their properties.[35] These classifications have had particular implications for conservation and land use policies (Stickler et al. 2013). For example, the Brazilian Forest Code states that in Mato Grosso, properties in the Amazon forest are allowed to clear only 20% of the area, while in the *Cerrado* 65% can be used for agricultural purposes (Hercowitz 2009). More recently the classification of transition areas has appeared more appropriate for Querência, and some actors, such as Greenpeace and Grupo Maggi, are even including it within the Amazon Biome (Greenpeace 2006; Grupo Amaggi 2011a).

The municipality is well endowed with a network of watercourses, being set in the Xingu River watershed. The main river is the Suiá-Miçu, with its tributaries Darro, Paranaíba, das Pacas, and Wawi. Some 70% of the territory is located in the watershed of the river Suiá-Miçu (Lopes 2006). Another major river is the Culuene, "with its tributary Tanguro, which is the main water collector for the Xingu River" (Rossete 2008, 58).

The climate in the municipality is classified as 'tropical continental'in the southern area, with an average annual temperature between 23.2 and 25.4^{o} C, and the coldest average temperature over 18^{o} C. The northern area's climate is "equatorial continental", with higher average temperatures between 24.3 and 26.8^{o} C (Rossete 2008, 18). The annual rainfall is high, with rains long enough for a second planting in the same year: soybean varieties with short growing periods and maize as a second crop. Moreover, the rainy and dry seasons are clearly defined. The greatest rainfall occurs between October and April, "with 75% of the amount between November and March", varying between 1800 and 2400 mm per year (Corrêa 2000, 9). The dry, winter season is between May and September, "when 86% of the rain falls are less than 60 mm" (Corrêa 2000, 9). Since agricultural activity takes place in the rainy season, lower rainfall can limit production.

[35] This discussion was raised by soybean producers during the public hearing to debate the Socio-Environmental and Economic Zoning in MT, held in Barra do Garças-MT in April 2009.

The main types of soil in the region are *Latossolo Vermelho-Amarelo* (67% of the area), and the *latossolos vermelho-escuros* (19.22% of the area) both of medium clay texture (RADAMBRASIL 1981 in Corrêa 2000; Rossete 2008). The predominant soil is considered by Embrapa researchers as "deep and with good physical characteristics, not restricting the development of plant root structures, allowing the use of any agricultural machinery in, generally, flat and softly undulating terrain" (Corrêa 2000, 9). However the chemical properties of the soil can be a limitation for agriculture; it is a soil "with characteristics of low natural fertility that needs to be corrected for agropastoral use" (Jacomine et al, 1995 cited in Skorupa 2006, 4).

Furthermore, this classification of good bio-physical characteristics for agricultural land use (Corrêa 2000; 2002; Lopes 2006) is part of the debates around establishing socio-environmental and economic zoning to plan land use in the municipality (Rossete 2008). The *Zoneamento Socioeconómico Ecológico* (Socio-Environmental and Economic Zoning, ZSEE) for Mato Grosso has been a highly contested and long policy process. It has included public hearings in which multiple stakeholders have participated, but has also been object of political manipulation, leading to the State Congress revoking the ZSEE version that derived from the hearings (Torezzan 2010; Vargas 2010). In the case of Querência, the public meeting took place in Barra do Graças. A considerable number of soybean producers were present and lobbied in favour of their assumed interest: to support the possibility of land use change according to the criteria used for *cerrado* rather than the restrictions applied to Amazon forest areas. Lorenzo (see Chapter Five, Case Five) a soybean producer argued:

> [In Querência] all the areas good for mechanisation should be used, leaving aside the riparian areas, which are not suitable for agriculture because of the soil or inclination. Those that are further north than Querência should be for conservation.

In terms of "the characteristics of the physical environment with a flat landscape, deep soils and adequate climate, [...] more than 95% of the area of the municipality is highly suitable for agriculture and cattle ranching" (Rossete 2008, 92). However, the idea of occupying most of Querência with agriculture is obsolete, particularly because 40% of the area is officially recognised as indigenous territory, and conservation practices are increasingly acknowledged as necessary for a sustainable development (see Table 4.1).

Table 4.1: Proposal of socio-economic ecological zoning

Zone	**Area (ha)**	**Area (%)**
Protected Area*	723.422.59	40.81
Intensive Use	561.753.63	31.69
Forest Management	276,237.67	15.58
Preservation of Water Resources	125.223.70	7.06
Multiple Use	85,408.90	4.82
Urban	631.64	0.04
Total	**1,772,678.12**	**100.00**

Source: Rosset (2008, p. 108). Note: * mainly as indigenous territory

Many studies of the biophysical characteristics of Querência have raised concerns over socio-environmental impacts, particularly around the agricultural practices of soybean producers (Corrêa 2002; Mendes de Oliveira et al. 2010). These have also shown the presence and importance of ecosystem diversity and its multiple current and potential uses, e.g. ecosystem services. These studies inform practices, but are also part of the legitimation of ways of seeing nature and defining its use. This is true of Embrapa's work on soil management (Corrêa 1999; 2000), which is considered to have been crucial to improvements in agricultural practices in Querência. As mentioned by an agronomist based in the region, Embrapa has had an important role in promoting no-till farming.[36] Likewise, in the last five years Embrapa has established demonstration areas to research and promote *integração Lavoura Pecuaria e Floresta* (Agriculture, Cattle and Forest integration, iLPF). This research forms part of the policy process in which knowledge is contested, negotiated, and legitimised.

Historical processes of land colonisation and land use:

Querência, according to the official division of the state, belongs to the Canarana micro-region, and the Northeast meso-region of Mato Grosso, popularly known as "the Low Araguaia region" or the *valle dos olvidados* (valley of the forgotten).[37] The municipality of Querência was created on 19th December, 1991 by state law nº 5,895. It was an incision of the municipalities of Canarana and San Felix de Araguaia. It is 912 km from

[36] Interview with Adão Caumo, Querência, 9thMay 2010. Also Milton Eichholz, Querência, 18thFeb 2010, reiterated that Embrapa technicians had an important role in informing agricultural practices during the time it had a partnership with the municipality.

[37] This name refers to the policy exclusions that this region has suffered in comparison to other regions in MT.

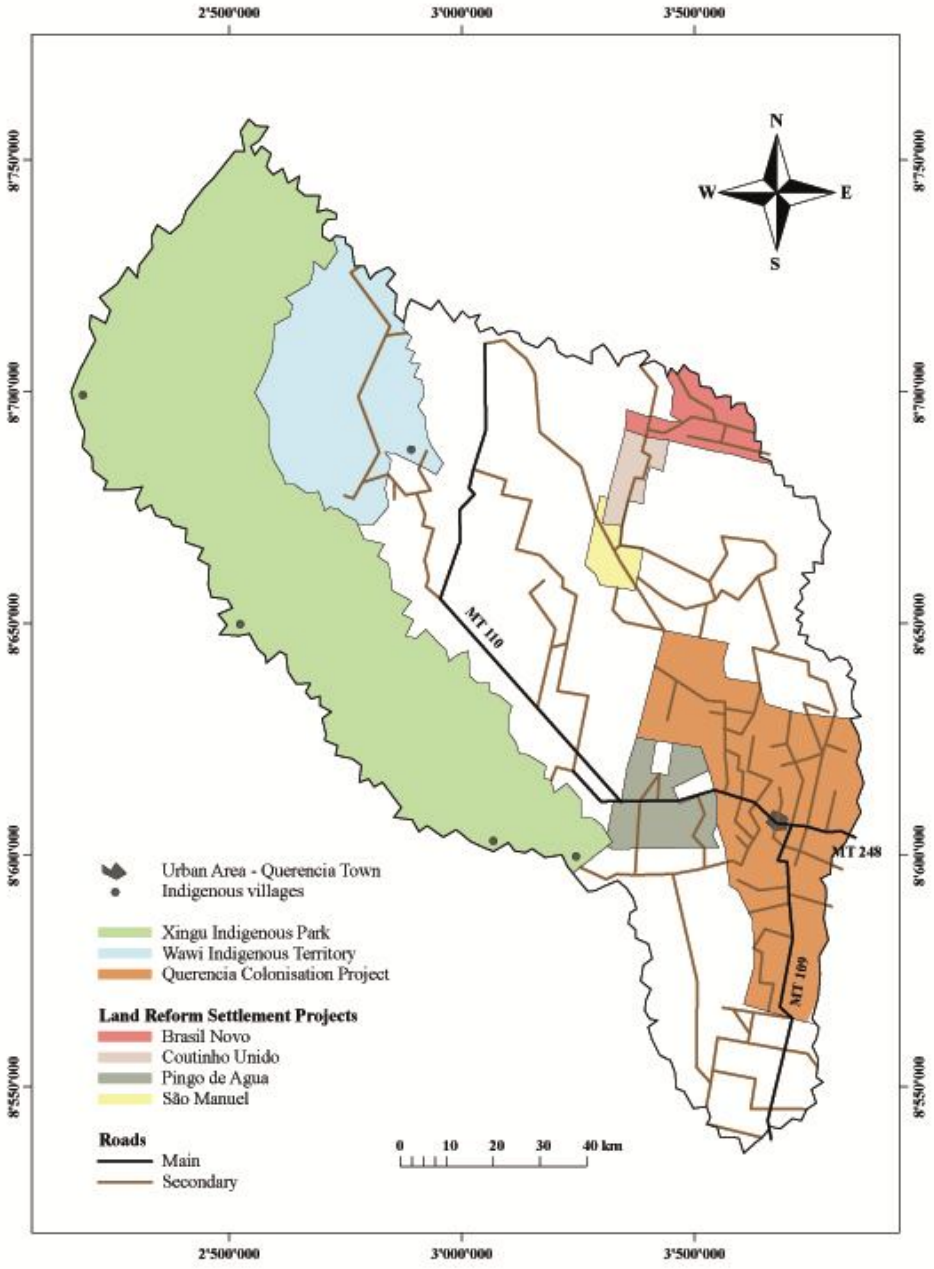
Cuiabá, the capital of MT, and 430 km from Barra do Garças, the nearest large town.[38] In 2009 Querência had 10,682 inhabitants living in an area of 17,850 km². This included 7,381 km^2 of the Xingu Indigenous Land and Wawi Indigenous Territory, 4,643 km^2 of forest, 1,163 km^2 of farming land, and 997 km^2 of pastures (MMA 2009). By that year, 4,965 km^2 (28% of the total area) had been deforested (MMA 2009).

Querência is a multicultural agricultural frontier that is undergoing diverse forms of rapid change. This is reflected in the presence of indigenous and migrant populations with different cultural and socio-political backgrounds. The area that today constitutes the municipality of Querência has been the subject of four main types of land colonisation policy processes (see Figure 4.1): a) the creation of two indigenous territories; b) the appropriation of vast areas by colonisation companies incentivised by the government in the 1960s (Castro et al. 2002); c) the private colonisation project started in 1985 by the cooperative COOPERCANA, which led to the creation of the municipality of Querência in 1991; and d) the creation in the late1990s of LRS for small-holding farming by INCRA (Cardoso et al. 2005).

Even today there are still tensions in the relationships between the indigenous groups and non-indigenous populations of Mato Grosso (Sanches and Gasparini 2000; Glass and Biondi 2011). In Querência 40% of the area is reserved for two indigenous territories (see Figure 4.1). The *Parque Indigena do Xingu* (Xingu Indigenous Park–PIX in Portuguese) founded in 1961 and the adjacent Wawi Indigenous Territory (WIT) formalised in 1998. The Xingu River region became a focus of policy attention in the 1940s, when it was considered a large unpopulated space with potential for agricultural development. But it was only in the 1950s the Villas Boas brothers established contact with diverse indigenous groups, as part of the *Expedião* Roncador-Xingu. This paved the way for realising the idea of the PIX, as well as colonisation projects organised by the government *Fundação Brasil Central* (Moreno 1993; ISA 2012). In 1991 the PIX was demarcated, comprising 2.6 million ha and occupied by 14 ethnic groups. It overlaps with nine municipalities, including Querência. Moreover, the Kĩsêdjê

[38] In the 1960s the large municipality of Barra de Garças covered a vast area between the Xingu and Araguaia Rivers (Barrozo 2009), an area larger than England. Since then it has been divided into various municipalities, including Querência.

Figure 4.1: Map of Querência - Indigenous Areas, Colonisation Project and LRS



Notes: The area for the Querência Colonisation Project corresponds to the demarcation in 1985, and gives a reference in contrast to the size of the LRS.However the Querência colonisation process extended to the rest of the municipality, excluding the designated indigenous land.
Source: Author, adapted from (Rossete 2008, 71)

indigenous group whose territory was formalised in 1998 as WIT in an area of 150,329 ha (Seeger 2003, 3), are struggling to have their territory recognised outside the PIX. The PIX and the WIT are now "surrounded by one of the most active agropastoral economic regions of Brazil" (Brondizio et al. 2009, 256). The need for policies to minimise the negative socio-environmental effects on the livelihoods of indigenous people has become more obvious to stakeholders (Mosimann da Silva 2003; ISA 2007; Glass and Biondi 2011). This has sparked the *I Ikatu Xingu* (Save the Waters of the Xingu River) campaign, with the participation of indigenous people, land reform settlers, and medium and large soybean farmers among other local stakeholders (ISA 2007).

The policies to occupy the Amazon started in the 1930s with the *Marcha para o Oeste* (March to the West), and as a continuation the *Superintendencia de Desenvolvimento da Amazônia* (Superintendence of Amazonian Development –SUDAM) was created in 1966. It was in charge of colonisation projects in the whole of the Legal Amazon region (Coy and Kohlhepp 2005). According to Pereira and colleagues (2002 in Barrozo 2009, 22), in the 1950s there was a change in the logic of "integration" of the so called "*espaços vazios*" (empty spaces) of the Amazon region into the national economy, from one that focused on occupation through small land-holdings to one that invited private companies to appropriate large holdings – and induced their participation with economic incentives. Legislation was passed that allowed the acquisition by private companies of "areas of up to 500,000 ha in the case of colonising companies; up to 72,000 ha for forest management projects, and up to 66,000 ha for agropastoral companies" (Barrozo 1992, 32; author´s translation).[39] Legitimised by this land occupation logic, vast areas of land were transferred to colonisation companies.[40] This process has been criticised for reproducing the colonial *latifundio* and contributing to land speculation (Barrozo 1992; Castro et al. 2002).

[39] *Agropecuaria* companies refers to companies which at that time were involved in extensive cattle production

[40] Among the most notorious were Sadia, Timber da Amazonia, Volkswagen, Mappin, Bradesco, Tamakavi, and Bordon (Barrozo 1992, 27). Among producers of soybean in Querência it is said that both Bradesco and Tamakavi had properties in Querência (talk with group of soybean producers, Querência, 22nd February 2010). The first is said to have sold the Tanguro Fazenda to Grupo Amaggi, and there is a large *fazenda* neighbouring the LRS Brazil Novo with the company name of the second.

It was also in 1966 that the large municipality of Barra de Garças was officially declared a "pole of development" for the state of Mato Grosso, and the BR-158 road linking Barra de Garças and San Felix do Araguaia was built "to implement the policy of occupation of the region" (Aguiar 1994, 40).[41] By 1981, from the 213 private colonisation projects – approximately 34.5 million ha – that had been approved for Mato Grosso, 74 projects – 34.74% – were in Barra de Garças (Barrozo 1992 p.31-33). It was at that time that the 80,000 ha *Fazenda* Tanguro and the 90,000 ha *Fazenda* Maria Teresa (Teresinha) were demarcated in what became Querência. The first became, in 2002, the 12th farm of the mega-large soybean producer Grupo Maggi (see Chapter Five, first case). The second was occupied by both small-scale and large-scale producers in the late 1990s (see Chapter Five, case three). Furthermore, these large areas are now part of the increasingly profitable land market, where speculative capital is benefiting from the increase in land value.

A third land policy process that has shaped land distribution and territorial development in Mato Grosso is that of private colonisation. This mode of land occupation was undertaken by cooperatives and colonisation companies during the 1970s and 1980s (Moreno 1993; Jepson 2003; 2006a). Many of these private colonisations were carried out in what was the large municipality of Barra de Garças. It was there that in 1971 the colonisation cooperative COOPERCOL created its first successful colonisation project, Canarana. In June 1975 the members founded COOPERCANA, which became the "largest cooperative in Mato Grosso", and the organiser of the Querência colonisation project (Schwantes 2008, 111). Using government incentives – mainly the Land Distribution Program PROTERRA, established in 1971 – the cooperatives and companies accessed land and subsidies. "[T]hirty-five private enterprises organised 104 projects to colonise 3.9 million hectares in Mato Grosso" (Jepson 2003, 100).[42] These ventures, as Wendy Jepson (2003, 98) shows, were heterogeneous projects that differed significantly according to "firms' organisation, access to capital, process of land acquisition and land tenure establishment, colonist recruitment, and involvement with

[41] Barra do Garças, "the oldest region used by the Amazon occupation policies, [was] known by the pre-1964 government as the 'novo eldorado' and 'porta da Amazônia'" (Ribeiro and Da Silva 2010, 14; author´s translation)

[42] Moreno (1993) points out that in addition to the private colonisation project there were fourteen colonisations carried out by the government directly. This official colonisation in Mato Grosso accounted for 5.5% of the total area of colonisation projects in the Legal Amazon between 1970-1990, while private colonisation accounted for 39% (Jepson 2003, 119)

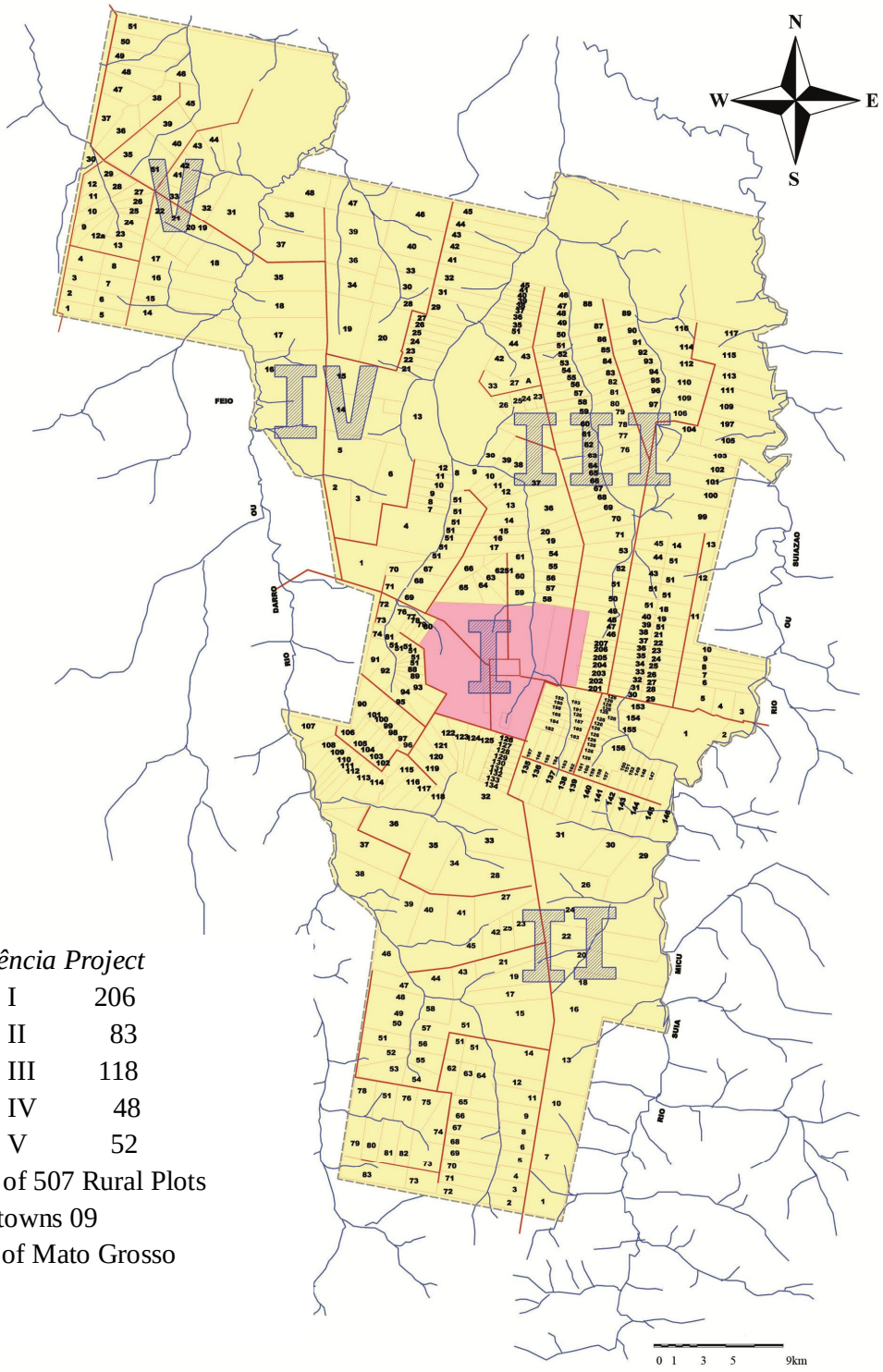
the state". Indeed, as explored further below, these aspects help to differentiate the Querência colonisation project.

The Querência colonisation project was inaugurated by COOPERCANA on 8th December, 1985. The colonist families started to arrive in 1986 (Falabretti 2010).[43] The project was planned and implemented in what had been the 180,000 ha *Fazenda Betis*, owned by the Peres Maldonado family, of Spanish origin.[44] It had been bought for COOPERCANA by the Lutheran minister Norberto Schwantes, a founder of the cooperative. The colonisation was planned on an area of 153,594 ha (see Figure 4.1 and 4.2)[45], which was a significantly larger area than any of the projects that COOPERCOL had engaged with before, usually at most 40,000 ha (Jepson 2003, 376). It was the first project of three carried out by COOPERCANA as an agricultural cooperative – independent of the colonisation cooperative COOPERCOL, which had arranged the previous colonisations – but also one of the last projects in the large region of Barra do Garças that COOPERCANA was involved in before it declared bankruptcy in 1994 (Jepson 2003; Bonfanti 2006).[46]

The Querência project was different from the previous colonisations (cf. Moreno 1993; Jepson 2003). Not only was this project larger in area than previous projects, but this time plots could be acquired in different sizes, "according to what the owner wanted".[47] The COOPERCOL in previous projects followed "the technical side to decide the size of the plots [...] projected economic calculation [...] to arrive at the measure of 400 ha as sufficient to sustain a family" and "prove to INCRA that it would be possible to pay back the land and the machinery".[48] Thus 400 ha was the standard plot size used for previous projects, of which 200 ha were meant to be left as forest reserve and 200 ha could be cleared.[49] In Querência the size of the plots varied, "from less than 50 ha to

[43] Interview with Edio Schwantes, Xavantina-MT, 4thMay 2010.
[44] Interview with Helio Vitorino, Querência, 23rdFebruary 2010.
[45] The colonisation project constituted 8.6% of what became in 1991 the municipality of Querência.
[46] Interview with Alcides José Salamoni, Founder and President of COOPERCANA at the time, Agua Boa, 4thMay 2010.
[47] IIbid.
[48] Schwantes, Op.Cit.
[49] Salamoni, op. cit.

Figure 4.2: Querência Colonisation Project (1985-1989)



Querência Project

Stage I	206
Stage II	83
Stage III	118
Stage IV	48
Stage V	52

Total of 507 Rural Plots
Agrotowns 09
State of Mato Grosso

Source: Author´s adaptation from original, Municipality of Querência, Denir Perin Administration, n.d.

more than 500 ha".[50] As Salamoni recalls "it had plots for small producers [and also] for rich people to enter with other levels of agriculture".[51]

The project was carried out in five stages, on a total of 506 rural plots, with nine planned *agrovilas* – areas planned to develop as rural villages – and an urban centre. The first families that arrived lived in improvised housing under plastic tarpaulins. The planned urban centre was soon populated, Falabretti remembers: "we would go to sleep and the next day there would be another family" (2010, 1). The nine *agrovilas* did not develop as planned, but the urban centre was the main point of arrival and later became Querência town. The urban centre had initially 2,861 plots, surrounded by 365 small farming plots. Each family buying an agricultural plot would get one plot in the urban centre, and could acquire a smaller plot in the surroundings (*chácaras* of 10 ha to 30 ha). Some families bought more than one of these urban sector plots and also *chácaras*, not all of which were in use by 2010, but instead served livelihood strategies as inheritance or were part of the property market. It is this urban centre, the town of Querência, where the majority of soybean producers of the municipality live, an aspect that characterises their farming styles, in contrast with other farmers who live on their farms, whether *chácaras* or LRS plots (see Chapter Five).

The rapid development of towns associated with these colonisation projects, or private land reform, is also relevant to situate the soybean agri-food systems (Pereira and Kahil 2010). Indeed, the creation of municipalities associated with these towns is part of the narrative of the successful pioneers who migrated from the south to MT to clear forest and establish large-scale farms (see Chapter Three). Although this narrative forms part of the dynamics of dominance of influential interest groups around the production of soybean, it is relevant to acknowledge that the political history in soybean production areas, including the emancipation of a territory, contributes to the identity formation of the population in this location, beyond the forces of the soybean agri-food systems themselves. The confluence of political and economic power is often considered as a single trend, sometimes conflating the political dominance of particular groups with the economic predominance of soybean producers. But this relation is not a given.The

[50] Interview with Juvino Gomez, former member of the municipal chamber, Querência, 11th February 2010
[51] Salamoni, op. cit.

assumption that all soybean producers are part of the privileged political groups in these municipalities restricts a nuanced understanding of the socio-political, socio-economic, socio-ecological and socio-technical dynamics that are shaping the livelihood strategies and farming styles in these municipalities (a difference further explored in the cross-scale comparison of farmers in the next chapter).

Another difference in the Querência project was that in previous projects the use of plots for small-scale agriculture all around the urban sector was not contemplated.[52] According to Edio Schwantes, in the previous projects "the use of nearby plots had developed for food production for the people living in the *agrovilas*"; this served as inspiration when planning Querência.[53] This indicates that in the initial project for Querência there was space planned for other farming styles, and large-scale production was not the only modus operandi intended. However, not all these *chácaras* ended up being used for the purpose initially planned – by 2010 many were used to plant soybeans for export or had become plots for houses (see Chapter Five, cases three and eight).

Still, some of these are currently used for family farming, by people popularly known as *chacareros*[54], who produce food crops and process products to sell in town (see Chapter Five, case seven). These families of *chacareros* own plots from10 ha to just over 100 ha. They belong to a different social category from soybean producers and *assentados* (land reform settlers). Some are families that arrived at the beginning of the colonisation, others arrived later on.[55] The socio-economic viability of producing food on a small scale is situated in a contested process, where policies that may improve its chances of success are debated and defined. However, the balance of power has often tended towards those that have no belief in its viability and promote the predominance of large-scale production. This is true of Fernando Gorgen, the Mayor of Querência (2005-2012) and large soybean producer (see Chapter Five, cases seven and eight). Furthermore, at the beginning of the colonisation project some people were able to buy contiguous plots, and through the years, some people argue, there has been

[52] Schwantes, op. cit.
[53] Schwantes, op. cit.
[54] The category of *chacareros* is not unique to Querência: it refers to owners of a small-plot, generaly for farming.
[55] Interview with Milton Eichholz, agroecological *chacarero*, Querência, 18th February 2010.

concentration of these plots by soybeans producers, constraining the viability of *chacareros'* production of food for the town.[56] The *chacareros* have their own association to defend their interests, such as creating a food market in town. They and the *assentados* (see below) are both beneficiaries of policies geared to strengthening family farming.

Finally, a fourth land colonisation policy process that has shaped and is shaping migration and farming styles in Querência is the creation of Land Reform Settlements (INCRA 2005). The municipality has five LRS established at the end of the 1990s on officially expropriated large-cattle ranches (see Table 4.2). It is mostly in these LRS that family farming is a livelihood strategy. Moreover, the creation of these has involved the migration from eastern states of different social groups from those that predominated in the private colonisation by COOPERCANA, who came from the south of Brazil. A full comparison of the private and public reform settlements is outside the scope of this research, but it is relevant to recognise some of the differences to understand the development of diverse farming styles. Moreover, the history of these LRS is still to be studied, and it is absent from the broad narratives of soybean expansion (see Chapter Three).

Table 4.2: Creation, plot size, and total area of LRS

Settlement	Expropriation*	Occupied	Creation	Consolidation**	Average size of plot (ha)	Nº plots	Total Area (ha)
Brasil Novo	1997	1998	1998	--	60-70	358	27.905
Coutinho União	1993	1993	1995	2001	90	172	15,739
São Manoel	1998	2000	1999	--	Up to 70	183	13,725
Pingo de Agua	1998	1997	1998	--	30 to 90	549	38,409
Nova Canaã	Occupation in process of recognition by INCRA				n.d.		12,000
				Total		1262	107,778

Notes: * Legal action by the government for the purpose of land reform (complementary law Nº 76,6th June,1993)
** Classification of LRS for which INCRA considers the land reform implementation finished.
Source: Adapted by author from INCRA (2005)

[56] Eichholz Ibid.

Querência is the southern municipality of the Low Araguaia region, in the north-east of Mato Grosso. It is considered one of the most marginalised regions of the state (Garbin and Silva 2006). It is a region that has undergone multiple waves of migration (Casaldáglia 1971; Barrozo 2009). These were spontaneous migrants from the states of Maranhão and Para in the early twentieth century, who settled on the banks of the Araguaia river as small-scale farmers, on the border of Goias and MT. Then in the late 1950s, another wave of small-scale subsistence farming migrants from Goias, Minas Gerais and Maranhão crossed the Araguaia river westwards to the Mato Grosso side, displacing the indigenous population in the region (Barrozo 2009).[57] These migrants are commonly labelled as *posseiros* (squatters).[58] These migrations have been part of a history of land conflict, between indigenous groups, small-scale farmers (or *posseiros*), and large land owners, a history that has characterised the Low Araguia region (Casaldáglia 1971; Aguiar 1994).

These spontaneous migrations occurred mainly in the municipalities north of Querência. Only later, particularly with the creation of land reform settlements in the 1990s, Querência received people from these other municipalities in the Low Araguaia region. Other *assentados* came from other parts of Mato Grosso or even other states, such as Goias and Maranhão.[59] It is in terms of waves of migration that the history of LRS in Querência can be related to the previous spontaneous occupation by small-scale farmers of the Low Araguaia region. The organisations *Pastoral da Terra*, ANSA, Fase-MT, and ICV, with an anti-soybean agribusiness narrative, work in the region with these small-scale farmers, to strengthen their economic viability. They promote agroecological practices, a fruit micro-industry, exchange of experiences, and building leadership capacity, among other things.[60] Moreover, family farmers in the region, including in Querência, have been target of the *Territorios da Ciudadania* (Citizens´ Territories) policy, which promotes a dynamic and sustainable rural development in marginalised regions (MDA 2006). They have also been targeted by the federal government *Programa de Aquisição de Alimentos* (Program of Food Acquisitions - PAA) and the

[57] G*arimpeiros*, miners in search of gold, also migrated. (Barrozo 2009)
[58] In Brazil a legally recognised category.
[59] Interview with Aldo, president of the agroecological producers association Estrela da Paz, LRS Brasil Novo, Querência-MT, 5th March 2010; interview with Joaquim Francisco Ferreira (Americo), INCRA technician in charge of the Araguaia region, Barra do Graças-MT, 24th August 2010.
[60] See the work in this region by the Xingu Araguaia Articulation (AXA), including ISA, Nossa Senhora da Assunção Association (ANSA), CPT, IPAM, and others (Brianezi 2009)

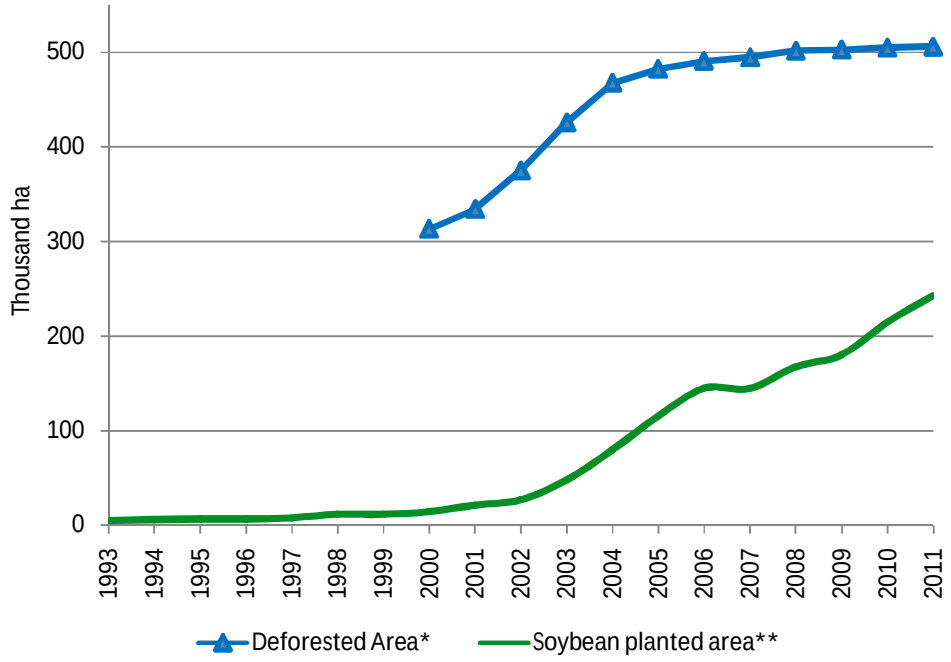
Programa Nacional de Alimentação Escolar (National School Food Program - PNAE), which both ensure a market for family farm products (CONAB 2009).

In sum, the confluence of these multiple formal and informal migrations – related to the various colonisation processes – resulted in a heterogeneous social landscape with ongoing contested processes of socio-economic, political, technological and environmental change. These dynamic processes contrast with the linear accounts of soybean expansion that either reduce the colonisation process to a success story of pioneers from the south (*sulistas*) that became large-scale farmers, or to a story of conflict and contestation between corporations and large-scale farmers and small-scale farmers (see Chapter Three). Instead, these multiple colonisation processes make Querência a culturally diversified region that embraces various farming styles which continue to interact, co-exist and co-evolve over time. The multiple histories that overlap in Querência explain the existence of contestations over land use change in the area and the multiple interests involved in defining and pursuing contrasting farming styles and sustainable agricultural practices. As the cases of farmers presented in the next chapter illustrate, different origins of migration and farmers' life histories, interlinked with the colonisation process, shape their farming styles.

Stakeholders and the predominance of soybean production

The history of soybean production in Querência is still a recent one. However it is the scale and speed of land use change that has characterized the process (Maeda et al. 2008). This is reflected in the deforestation and the rapid increase of soybean production since 2000 (see Figure 4.3). Broadly speaking, before the Querência colonisation project, besides the indigenous territory the area consisted of a few vast ranches, many of them owned for land speculation purposes, which practised extensive cattle breeding and had large areas of untouched forest. As the population increased with the Querência Project and later the LRS in the 1990s, a timber cycle defined the economic activity. The first soybean fields were planted in the early 1990s, but it was not until the 2000s that the agricultural activity came to be characterised by the increase in soybean production and the establishment of corporate actors. These activities should not be taken as consecutive cycles, but rather as interwoven processes. These processes have

Figure 4.3: Deforested area (2000-2011) and soybean planted area (1993-2011) in Querência.



Note: Soybean production before 1991 is registered under the municipality of Canarana.
Source: *INPE (2012) **IBGE (2012)

left a heterogeneous landscape: degraded land from the cattle ranching before cooperative colonisation, deforested areas left idle, agricultural fields, and forest areas.

Economic activity based on forest resources in Querência had and still has direct implications for soybean-based livelihood strategies. From the 1990s, once the majority of the colonisation project plots had been distributed, land use change was closely related to clearing forest. This involved the presence of more than 20 sawmills, and considerable numbers of workers, often with low remuneration and poor working conditions.[61] This was seen in Querência as a boom that drove development, but in the early 2000s it was drastically curtailed due to government pressure to comply with forest management legislation. For example, 18 illegal sawmills were closed down, leaving only two that had licences.[62] Moreover, this period coincided with timber

[61] Interview with Hector Durero (see Chapter Five, case four)
[62] Interviews with Denir Perin, Querência´s ex-mayor (1993-1994 and 2001-2004), owner of a sawmill, and soybean producer, 25thMarch 2010, Querência.

becoming scarce near Querência town.[63] This reduction in sawmills meant that workers had to find jobs elsewhere, and a few of them found plots in the LRS.

In the late 1990s the Brazilian government started to monitor closely what has been called the "arc of deforestation", where the highest rates of deforestation in the Amazon Biome occur (Alencar et al. 2004). In the case of MT the arc of deforestation corresponded – broadly speaking – to the transition areas between *Cerrado* savannah and Amazon forest. Querência is within the arc and was in the list of 45 municipalities with the highest rates of deforestation. In these municipalities the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), the federal police, and Mato Grosso's military police acted collectively to reduce the high rates of deforestation and fires. The actions also resulted in commercial embargoes and credit restrictions for rural farmers, including the LRS. By 2011, Querência was the second municipality to be taken off the list of highest deforestation rates. Among the legal requirements was the obligation to register at least 80% of the relevant territory in the *Cadastramento Ambiental Rural* (Rural Environmental Registry: CAR),[64] and to reduce the municipal rates of deforestation to no more than 40 km^2 per year (ISA 2011).

Agricultural practices and soil management for soybean

Agricultural practices related to soybean production in Querência have changed since it was first introduced in the late 1990s. Many of these changes relate to soil management. For example the application of *calcario* (pulverised limestone or chalk) to correct soil acidity has been crucial for farming in this region. As many farmers mentioned during my interviews, at the beginning of the colonisation project, "without it [*calcario*] you can´t produce on this land [...] not even a single root of cassava; maize grew with a small cob, and rice was almost unproductive".[65] This has become common practice: lime is crucial for producing most agricultural crops. How farmers manage soil and productivity has changed in respect of how it is obtained and used, e.g. application according to precision agriculture (see Chapter Five). However, lack of financial

[63] Interview with Helio Vitorino Silva, Querências ex-mayor (2007-2000) and land broker, 19th February 2010, Querência.
[64] The CAR involves georeferencing the property and a commitment by farmers to adjust to environmental legislation, such as to protect the Areas of Permanent Preservation, or riparian areas, stipulated in the Brazilian Forest Code.
[65] Interview with Genesio, small-scale farmer, early coloniser of Querência, 20th Feb 2010, Querência.

resources has made access to lime difficult, particularly for *assentados*. By 2010 just two companies supplied eastern MT, indicating a market concentration of this fundamental agricultural input.

Agricultural practices in Querência, particularly soybean farming, have interested researchers from Embrapa for a long time (Corrêa 1999). The main area of collaboration between farmers and the researchers is soil management technologies. Studies by Embrapa showed that the low rate of adoption of no-till agriculture was having detrimental environmental and production implications (Corrêa 2002). The adoption of this agricultural technique differentiates practices between farmers; for example, some were early adopters and others have adopted only certain aspects of the recommended procedure. By 2010, it was believed that most farmers had adopted no-till farming, or at least semi no-till farming (e.g. reduced grading, or no-till without a second crop as cover). In addition to these techniques, Embrapa has been promoting iLPF (Agriculture, Cattle and Forest integration). This involves crop rotation, particularly rice, soybean, and grass, and combines no-till agriculture with cattle raising and forest management.[66] Since 2007, as a technology transfer strategy Embrapa has sponsored a demonstration unit in collaboration with farmers, corporate groups such as the Bunge corporation and the seed company Pioneer, and local partners including input providers and NGOs such as *Instituto Socioambiental* (ISA) and *Instituto de Pesquisa Ambiental da Amazônia* (IPAM) (Wruck and Franchini 2007). ILPF is recommended for medium and large-scale farmers as a way to increase production and improve the environmental sustainability of soybean production (Franchini et al. 2010). Aspects of this integration are already being adopted by some farmers in Querência.

Silos and arrival of corporations

During the first years of the Querência colonisation project, COOPERCANA was the main organiser of agricultural production, until 1994 when it went bankrupt.[67] The cooperative mainly promoted rice as a cash crop. This was the most convenient first crop for fields recently cleared of forest and degraded areas previously used for cattle. Indeed, the cooperative´s silo in Querência was only used to trade rice. The first soybean producers transported their harvest to the neighbouring municipality Canarana,

[66] Inteview with Flavio Jesus Wruck, Embrapa agronomist, 5th Nov 2009, Sinop-MT.
[67] Interview with Alcides Jose Salamoni, former manager of COPERCANA, 4th May 2010, Agua Boa

where there were soybean traders (see Chapter Five, case four). Access to a silo had a catalytic effect for increasing the value of the crop. Consequently the introduction of silos in Querência has had a significant impact in shaping the organisation and prospects of farmers as well as the economic basis of corporate investors.

In 1993, a year before COOPERCANA went bankrupt and closed its silo (later bought by a farmer who operates it as a private company), a *Condominio* (a form of cooperative) was created. This was an association of soybean producers that reached 70 members, but by 2010 it had around 40 members. The silo is in use but according to the manager "the capacity and technology have not been upgraded in accordance with the higher volume of production of its members and the new market requirements".[68] Hector, a soybean farmer in the *condominio*, explained that this happened because producers spent their capital on opening and expanding their land (see Chapter Five, case four). Thus it is only now that they are stabilising, and plans to build another silo are being discussed. This, Hector thinks, will allow them to access better prices for soybeans and if well organised improve their chances to negotiate collectively with firms and the government.

Large agribusiness companies have been establishing themselves in Querência at roughly the rate of one corporation per year from 2000 to 2009 (see Table 4.3). Alongside these, other medium and small enterprises supply inputs and technical advice. The arrival of these various companies consolidated soybean as the predominant crop; farmers gained a relatively diversified choice of commercial arrangements to access inputs and sell their harvest, and companies established various dependency relations with producers. Grupo Maggi, discussed in some detail below, exemplifies the operation of these corporate actors and their power to shape soybean agri-food systems.

Grupo Maggi is one of the largest single soybean producers in the world and is amongst the six main soybean trading corporations in Brazil (See Table 4.3; van Gelder and Dros 2002; Schlesinger 2006; Greenpeace 2006). Its combination of production and trade is unique amongst all the corporations. In 2011 it was present in eight states in Brazil and had offices in Argentina, the Netherlands, Norway and Poland

[68] Interview with Neuri Norberto Wink, 26th Nov 2009, Querência.

Table 4.3: Arrival of larger agribusiness companies to Querência

Transnational	**Gross Income in 2004** (billion R$)[1]	**Total number of employees in 2004** (thousands)[1]	**Arrival in Querência and establishment of warehouse**[2]
Bunge	23,2	11	2000
Cargill	12,9	22,5	2004
ADM	2,8	2,6	2008-2009*
Dreyfus (Coinbra)	1,6	5	2007**
National			
Caramuru	1,8	2,4	2001
Grupo Maggi	1,3	1,8	2006
Agro Industrias Querência	n.d.	n.d.	2005
Multigrain	n.d.	n.d.	2009**

Notes: * First they established a trade office, then a warehouse; ** By 2010 these had only trade office.
Source: 1) Schlesinger (2006); 2) Interview with Milton Vianei Weber, Agricultural Technical, *Condominio* warehouse, Querência, 20th May2010.

(Grupo Amaggi 2011a, 19). In the state of Mato Grosso it has an extensive presence, with soybean production and trade operations in all four regions (see Figure 2.1). Its vertically integrated structure consists of five divisions (Grupo Amaggi 2011b):

- AgroDivisão, involved in agricultural and soy seed production, which by 2010 administered twelve soybean production farms in Mato Grosso (see Annex III).
- Amaggi Importação e Exportação ltda, in charge of origination, processing and marketing of grains, and fertiliser trade. This runs 41 warehouses with a total storage capacity of 2.6 million tonnes, and three soy crushing factories, distributed across the soybean production and trading areas of Brazil.
- Maggi Energia is an expanding division that in 2010 had two small hydroelectric power plants with 12.6 megawatts of installed capacity.
- Hermasa Navegação da Amazônia manages ports and river cargo. In 2010 it registered the largest waterways shipping fleet with 108 barges, 16 push boats, and two support and research boats.
- André Maggi Foundation, the company´s arm for social engagement.

Its geographic expansion, the management of a whole value chain from inputs provision and crop production to trading, processing and shipping, its involvement in agriculture research, and its political arm – represented by Blairo Maggi – make the company a key

player in defining the pathways of the soybean agri-food systems and its environmental and socio-economic implications (Silva 2005a; 2005b). It has been highlighted as a company that shapes the territories, or regions, in which it expands (Becker 2004). The presence of Grupo Maggi in Querência represents the process of advancement and consolidation of the soybean agribusiness in Brazil. It connects the municipality with the networks and dynamics of the global soybean markets, and to a certain degree its presence ensures the viability of mechanised soybean production in the region. Moreover, Blairo Maggi has been a crucial promoter of government investment in road infrastructure along the priority routes for soybean exports. In the case of Querência, during his mandate as governor a public-private partnership (soybean tax and state government resources) resulted in paving the BR-242 (Sergio 2009). This connects the town to the BR-158, which leads north to the Itaqui Port in the state of Maranhão, and the European markets.

The study of the company's history as well as its current activities corroborates the central role attributed by other researchers to both Blairo Maggi himself and the company in promoting and legitimising particular practices that are determining what sustainable soybean production is in Brazil (Saito and Azevedo 2010). The Maggi Group has been a crucial actor and has engaged in various environmental and social initiatives, such as the Soybean Moratorium and the RTRS (Round Table on Responsible Soy Association), besides obtaining the ProTerra certification, ISO 14001, and RTRS certification (Grupo Amaggi 2011a). The actual sustainability of its practices is highly contested, particularly by actors allied to the agroecological family farming narrative (see Chapters Three and Five). Moreover, it is used as an example of the successful large-scale producer that all soybean farmers can aspire to become. This proposition ignores the heterogeneity of farming styles present in the soybean agri-food systems (see Chapters Five and Six).

Class representation and rural unions

The rural unions in Brazil are crucial actors in understanding the formation of "class" identity, as well as the networks that relate farmers to state and national politics.[69] Most farmers are associated with either the workers' rural unions or the rural union, each

[69] A term used officially when refering to *entidades de clase* (class entities), such as the rural unions.

representing different circles of people. Broadly speaking, the latter is for large farmers that employ permanent workers (*patronal* farmer), while the former is for rural workers and family farmers. Most soybean producers are associated with the only *patronal* rural union. It was created in 1997 and belongs to the *Federação de Agricultura e Pecuaria do Estado de Mato Grosso* (Agriculture and Livestock Federation of Mato Grosso, FAMATO) and CNA system. However, this does not make soybean producers a homogenous political group, as differences are expressed and channelled through internal politics.

The collective political activism of soybean producers was strengthened with the creation of APROSOJA in 2005, another entity that is meant to represent them as a group with differentiated interests. According to the president, an association was needed to represent middle and large-scale soybean producers as "the FAMATO represents cattle producers, and the larger producers like Grupo Maggi represent their own interest".[70] This political association has created a network of associates in the soybean production municipalities of MT. The members receive advice on agricultural practices and are consulted on issues where the organisation can take responsibility. This has given the association a strong voice – as representative of producers – in the debates on sustainable soybean production (see Chapter Three). It has also confronted corporate interests that are seen as counterproductive for soybean producers, as in the case against the continuation of royalty payment for Monsanto's genetically modified Roundup Ready soybean seeds (APROSOJA 2013).

As a counterbalance of the RTRS certification, in 2010 APROSOJA launched the SojaPlus certification program. This is meant to help producers align their practices and properties with labour and environmental legislation, "stimulating good agricultural practices and socio-environmental improvements in properties with soybean production" (APROSOJA et al. 2010, 4). The medium and large-scale producers' organisation *Aliança da Terra*, in collaboration with IPAM and WHRC, had operated a similar initiative in Querência and neighbouring municipalities since 2007. This certification promotes a Registry of Socio-environmental Responsibility (RSR), requiring conservation of 55% of any property in the Amazon Biome, soil conservation

[70] Interview with Glauber Silveira Da Silva, President APROSOJA, 23th April,2010, Querência-MT.

practices, georeferencing of the property, environmental licence, and registration of rural workers according to law, among other obligations. These practices of responsible land stewardship are promoted as potential certification for entering the carbon credit market, or other market remunerations, to give producers incentives for their environmental practices (Aliança da Terra et al. 2009; WHRC 2009). These initiatives are setting farmers standards and criteria for sustainable agriculture practices.

The rural workers, *assentados* and *chacareros* have representation through the rural workers' union. In the case of Querência the union is part of the *Confederação Nacional dos Trabalhadores na Agricultura* (National Confederation of Agricultural Workers, CONTAG). Its formation in 1991 coincided with the establishment of the municipality, and for some time it was used politically to create the LRS. It was not until 2006 that the president was elected by the members and the union staff actually worked to represent rural workers and family farmers.[71] In terms of workers' rights the union has been a crucial arbiter between employer and employee, often solving disagreements about salaries or payment of medical fees for accidents on the farms. Registering workers' salaries is crucial for the Brazilian rural pension system. It is on issues of labour that the union becomes more involved with the dynamics of soybean production, but often workers are temporary migrants so the political relationship with the union is not built.

As for the relationship with the large-scale producers, for the president of the union it was clear that there had to be cooperation among farmers. Confrontational politics is played at the national level and not in the municipality. In the case of the government environmental efforts to enforce the Forest Code, small-scale farmers were also affected. This brought together the interest of all farmers, regardless of class or scale. The family farming loan programme, PRONAF, and other initiatives to improve access to credit were prohibited until the LRS were properly registered with a *Licenciamento Ambiental Unificado* (Unified Environmental Licence, LAU), and fire control and forest conservation were planned. By 2010 the union was working to strengthen family farming through diverse initiatives, such as the creation of a farmers' market and a

[71] Interview with Milton Eichholz, 18th Feb 2010, Querência

cooperative. For this it collaborated with the Association of Small Rural Producers formed by the *chacareros*.

Besides the unions, the Municipal Secretariat of Agriculture and Environment, and the state extension service *Empresa Matogrossense de Pesquisa, Assistência e Extensão Rural* (EMPAER-MT) are institutions in which the shaping of farming styles is contested. In the opinion of some large-scale farmers, neither of these institutions seems to offer services for them. These institutions do not provide much assistance to small-scale farmers either. They are affected by national and municipal politics and policy processes, often dominated by views that conceive small-scale agriculture as subsistence farming and thus too small to benefit from agricultural policies or technical assistance. Therefore this leaves these institutions in limbo with no well-defined role. However, the case studies that follow in Chapter Five demonstrate how the producers' relations with these institutions are not dichotomous, but rather create spaces for various farming styles to emerge. For example, with the promotion by the Municipal Agriculture Secretary of *popunha*-palm trees, rubber trees, and fruit farming, farmers of different scales of production are linked with other agroindustrial networks than the ones for the soybean agri-food system.

The last Agricultural Census (2006) indicated the existence of 611 rural establishments, of which 437 were classified as "with family farming" (holdings of no more than 480 ha each), and 174 as "with non family farming" (IBGE-FAO 2006). From the total, 121 establishments produced soybean (IBGE-FAO 2006). By 2009 the Municipal Secretary of Agriculture registered 160 soybean producers – with soybean plantations from 2 ha up to 31,200 ha – farming a total area of 188,493 ha (see Table 4.4). The data in the table indicates an unequal distribution of land (90 percent in the 13 percent of establishments of more than 1,000 ha), but also the presence of a significant number of potential small-scale producers, and a considerable number of medium size soybean farms (56.5 %). This distribution suggests a range of different farming styles.

Querência civil society activists and sustainability initiatives

In parallel with government environmental pressures, an active network of NGOs (Xingu Araguaia Articulation, AXA) has contributed to bringing to the forefront of debate the role of forest in sustainable development in Querência. These NGOs have

Table 4.4: Number of agropastoral establishments (2006) and soybean producers (2009)* per size of area in Querência

Scale of production	Number of agropastoral establishments and (%)[1]	Area of agropastoral establishments (ha) and (%)[1]	Number of soy producers and (%)[2]	Soybean planted area (ha) and (%)[2]
Small-scale (<100 ha)	400 (65.6)	26,158 (3.4)	20 (12.42)	1,073 (0.56)
Medium-scale (100ha>&<1,000ha)	131 (21.5)	49,540 (6.5)	91 (56.52)	41,240 (21.8)
Large-scale (1,000 ha>&<10,000ha)	79 (13)**	689,559 (90)**	49 (30.43)	114,920 (60.98)
Mega-Large scale (>10,000 ha)	-	-	1 (0.6)	31,200 (16.55)
Total	610	756,257	160 (100)***	188,433 (100)

Notes: * The scale refers to the size of planted area, and not to the land owned ** This category refers to establishments with more than 1,000 ha. *** There are 203 producers registered in the source but 43 are not included due to lack of data on soybean production.
Source: [1] IBGE-FAO (2006); [2] Municipal Secretary of Agriculture and Environment-Querência (various years)

contested how soybean plantations are expanding. In particular, forest within the farms has become a focus of dispute. For most farmers in Querência the preservation of riparian areas – that is *Area de Preservação Permanente* (Area of Permanent Preservation: APP) considered in the Brazilian Forest Code – is not in direct conflict with soybean production, and has led to new concrete conservation practices at the farm level. This has been catalysed with the *I Ikatu Xingu* organised by AXA, with ISA having a leading role. In contrast, the *Reserva Legal* (Legal Reserve - RL) is highly contested as it restricts production to only 20% of any property situated in the Amazon Biome. According to the fiscal organ IBAMA, Querência falls into this category, but this is contested by soybean producers. The resolutions on how much forest farmers in Brazil should leave as a RL is uncertain, partly due to frequent changes in the legislation,[72] but also to the high level of non-compliance, and both private and government actors being against strict conservation regulations.

The *I Ikatu Xingu* is a direct result of the concerns about conservation of the waters of the Xingu River and its tributaries. It has involved various stakeholders all around the PIX in debates about the need to preserve the APPs. As one of the consequences, ISA

[72] The Brazilian Forest Code was subject of reforms in 2012, after arduous debates and politics in which the environmentalists criticised the reforms for being permissive of unsustainable practices.

has pioneered a technique of agroecological reforestation with planters. This has involved creating a network of seed collectors and producers among indigenous people and small-scale farmers. The intention is to recreate the formation of native forest by planting multiple seeds at the same time, with other seeds, particularly leguminous ones, which will enhance the growth of plants and trees. The technique is geared to the requirements of large-scale producers that have to reforest large areas. Although the reforestation of APP is not what makes soybean production sustainable, as some stakeholders tend to believe, for these NGOs it is one way in which is possible to work with large scale producers.[73] For the Deputy Director of the ISA Xingu Program, Rodrigo Junqueira, the achievement in Querência "shows that advancements happen on the ground and that definition in other spheres is not needed for the municipality to do its share [...] It is a vivid example that it is possible to preserve and produce, without having to wait for voting in the forest code or the approval of the state zoning" (Sergio 2011, 1).

Conclusions

During its short history, soybean production in Querência has developed against a backdrop of geographical, economic, social and legislative forces: colonisation on medium and large farms, a timber economy coming under increasing scrutiny, and regulatory requirements as deforestation became a concern; the physical imperative of applying limestone to counteract soil acidity, and need for soil conservation practices to reduce degradation. Currently several stakeholders exercise their agency in Querência´s soybean agri-food system. Large agribusiness investment has been increasing steadily since 2000, typified by mega-corporation Grupo Maggi. Government, both central and municipal, has a significant impact on soybean production through legislating, enforcing rules such as the Forest Code and the CAR, and investing in infrastructure. On the organised labour scene, initially the union was weak but it has gained political influence as the growing presence of family farming – due to the creation of LRS – has increased its constituency. It works as a counterbalance to the large-scale farmers' union in policy processes that define farming styles. Sustainable development narratives are promulgated by activist CSOs, which have campaigned successfully for a minimum understanding of APP conservation, with sustainability regulations being adopted

[73] Interview with Rodrigo Junqueira, ISA, 8th June 2010, Canarana.

readily where it is expedient, and reluctantly where it diminishes profitability. Also corporations, eager to publicise their good side, have embraced a sustainable agriculture narrative, where intensification is the driving ideal.

Within this context, soybean farming has reached a high level of productivity, and farmers are accommodating their practices to the changing context, be these the soybean markets, with a greater presence of corporate actors, or the agro-environmental challenges that the chosen pathways to sustainability bring, demanding a new configuration of relationships. The sustainability of soybean production in Querência, then, is related to the role of forest as an ecological actor, as well as to the agrarian dynamics in the LRS that will define the viability of the family farm as an alternative to the large-scale, corporate soybean producer. Moreover, the sustainability of soybean production at the farm level is constructed in a context of diverse stakeholders influences. It is in this situation that a heterogeneous landscape of farming styles exists in Querência, as argued in chapter five and six, with the study of eight cases and a comparison of their farming practices across scales of production.

Chapter 5

Eight farming cases: livelihood strategies, farming styles, and agrarian dynamics

This chapter presents different livelihood and farming practices that exist across farms of different scales in Querência. Eight cases of farmers with different sized holdings and areas of soybean production are presented here to illustrate the diversity and complexity of agrarian dynamics. Rather than assuming a simple dichotomy of large-scale commodity producers and small-scale family farmers representing two starkly contrasting ways of farming, the eight cases reflect a diversity of livelihoods and farming styles that allow people to move in and out of different pathways of farming and create new ones. Moreover, they exemplify complex processes in which the agency of farmers is involved in shaping the changing role of soybean production beyond a commodity instrumentalised by multinationals and capitalist interests. This chapter therefore reveals how soybean is integrated into these farmers' livelihood strategies and their respective farming practices, and how they are involved in processes of transformation of their own farming styles and the soybean agri-food systems in which they operate.

As I discussed in Chapter Four, the life histories and livelihood strategies of farmers in Querência are marked by a process of migration that led them to settle at the agricultural frontier, in the transition area between the *Cerrado* savannah and Amazon forest. Moreover, as pointed out by various authors, soybean production in Mato Grosso is closely related to the migration of *gauchos* from southern Brazil (Kohlhepp and Blumenschein 2000; Castrillon 2007; see Chapter Three). The narratives presented above, particularly the agribusiness narrative, have led to a notion that all the migrants from Rio Grande do Sul, Santa Catarina or Paraná share the same origin and the same destiny, from being small-scale farmers in the south to becoming large-scale farmers at the agricultural frontiers. However, the diverse migratory trajectories exposed by the eight cases in this chapter provide a more sophisticated understanding of the diverse patterns of livelihoods and their effects on farming styles. For example, considering changes over time allows a differentiation in the context of arrival as well as differences in farmers' access to resources that shape ways of farming. This leads us to ask, what is

really going on in Querência? What does this heterogeneity of livelihoods and farming trajectories tell us about the rather more complex agrarian dynamics at the agricultural frontier (an aspect further explored in chapter six)?

The eight cases were selected according to the size of their area of soybean production (see Table 5.1 and Chapter Two). These are presented in this chapter in decreasing order of scale. The first case, *fazenda* Tanguro, a mega-large farm operated by Maggi Group, was in 2011 the largest soybean farm in the municipality – with 30,747.7 ha of soybean. The second and third cases are classified as large-scale farmers (with less than 10,000 ha and more than 1,000 ha of soybean production). One had 3,400 ha of soybean, owning two farms totalling 30,000 ha; the other had 1,400 ha of soybean on a 3,000 ha farm, but having bought in 2009 a second farm of 4,000 ha. The fourth and fifth cases are middle-scale farmers (with less than 1,000 ha but more than 100 ha of soybean production). One had 853 ha of planted soybean, of which 405 ha are rented from neighbouring small-scale and large-scale farmers. The other, while working as public workers in Querência town, farm 160 ha of soybean in three LRS plots.

The sixth, seventh, and eighth cases correspond to the small-scale farmers category (with less than 100 ha of soybean production). The sixth are farmers that have 90 ha of soybean fields in rented LRS plots, but are farming in a style that involves parents and siblings in a diversified production over 656 ha. The seventh is of *chacareros* with 27 ha of soybean and a diversified production over 29,7 ha near Querência town. The eighth farm is of agroecological farmers who had been large-scale soybean producers and in 2011 grew no soybean but rather had a highly diversified production in a LRS.

This cross-section of sample farms across scales of production was intended to capture the diversity of farming styles that could be found in Querência-MT, and the key elements that distinguish them from each other, such as land and machinery owned, hiring of labour, crops produced, area of forest owned, who they sell their products to, and what union they belong to (see Table 5.1.).The mega-large and the agroecological farms reflect the extreme ends of the polarized vision of farming depicted in narratives of the soybean agri-food system, discussed in chapter three, while the rest of the cases reveal diverse pathways that do not fit the simple notions of large-scale soybean producer or small-scale farmer. What is more, these cases show that scales of

Table 5.1: Key indicators of scale of production for eight cases, Querência, 2010

KEY INDICATORS	**Mega-large scale**	**Large-scale farmers I**	**Large-scale farmers II**	**Medium-scale farmers I**	**Medium-scale farmers II**	**Small-scale farmers I**	**Small-scale farmers II**	**Small-scale farmers III**
Range for selection (ha)	(> 10,000)	(10,000 < and > 1,000)		(1,000 < and > 100)		(< 100)		
Names	**Grupo A.Maggi**	**Igor & Carol**	**Antonio & Lumina**	**Hector & Rocio**	**Lorenzo & Monic**	**Fernando & Camila**	**Adão & Arlet**	**Elio & Rosa**
DoB of hh head	B.Maggi: 1956	1955	1964	1964	1964	1974	1969	1954
Arrival in Querência	2002	2001	1999	1988	1986	1999	1989	1987
Area of soybean planted in 2010 (ha)	30,747	3,400	1,400	835	160	90	27	0
Total land owned (ha)	80,863	30,000	7,000	372	180	60	29,7	75
Area rented(ha)	0	0	0	605	0	296	3.5	1
Forest area owned (ha)	46,655	23,400	4,800	133.9	20	24	1	8
Other crops	Rubber trees, tree nursery	Maize	Rice, and fruit and vegetable garden	Palm tree, teak, and fruit and veg. garden	Millet for no-till agriculture	Diversified	Diversified	Diversified
Cattle and area of pasture in 2010	None	5,000 head on 4,500 ha	5 on 800 ha	Few for self-consumption	none	50-60 on 120 ha	20 on 3 ha	108 on 100 ha
No. of workers	210	18-22	6	5	1	Family only	None	3 - 5
Equipment owned	More than 40	8 large-machines	6 large machines	4 large machines	3 medium machines	3 medium machines	1 tractor; small-agroindustry	2 tractors; small-agroindustry
Sales to	Own trading chain	Soybean to Louis Dreyfus; maize to local traders.	Soybean in *Condominio*, Bunge, and Louis Dreyfus; rice to local trader	Soybean to *Condominio*, Cargill, and Bunge; *palmito* to Luana agroindustry	Soybean to ADM and local trader	Soybean to Cargill, and Caramuru; rice to local trader	Soybean to Bunge, Cargill, Caramuru. Other products in farmers' market, supermarkets, and local shops	No sales of soybean. Other products through local shops, supermarket, and school meals programme.
Union membership	Patronal	Patronal	Patronal	Patronal	Rural Workers' Union	Rural Workers' Union	Rural Workers' Union	Rural Workers' Union

production differ in complex way across livelihoods, farming styles, and agrarian dynamics (Table 5.2).

By examining each of these cases in some depth in this chapter, I explore the relevant differences in agricultural practices and views of sustainability between farmers along the continuum of scales of production. I also examine how particular livelihood strategies and farming styles relate to the broader agrarian dynamics of soybean agri-food systems. The cases presented suggest that diverse migration trajectories, land use policies, and relations with labour, technology and markets have shaped livelihood strategies and farming practices in different ways. These aspects, further analysed comparatively in chapter six, highlight a diversity of farming styles that contrasts sharply with the dichotomous visions portrayed in the common narratives that shape much of the debate about soybean production in the agricultural frontier regions of Brazil.

Table 5.2: Livelihoods, farming styles and agrarian dynamics across scales of production								
Farmers Types	**Mega-large scale**	**Large-scale farmers I**	**Large-scale farmers II**	**Medium-scale farmers I**	**Medium-scale farmers II**	**Small-scale farmers I**	**Small-scale farmers II**	**Small-scale farmers III**
Range for selection (ha)	(> 10,000)	(10,000 < and > 1,000)		(1,000 < and > 100)		(< 100)		
Names	**Grupo A.Maggi**	**Igor & Carol**	**Antonio & Lumina**	**Hector & Rocio**	**Lorenzo & Monic**	**Fernando & Camila**	**Adão & Arlet**	**Elio & Rosa**
Livelihoods	Businessman and politician	Farmer, Large family, migration in search of larger-scale	Farmer, Family driven	Farmer, Family driven	Non-farming jobs, soybean as cash-crop not central to household livelihoods.	From rural workers to family farmers	From rural worker to family farmers	From large-scale farmer to small-scale family farmers
Farming style/practices	Corporate large-scale farming; precision agriculture	Agro-entrepreneur, large-scale farming, intensification with no-till double cropping	In transition to agro-entrepreneur; large-scale no-till agric.; careful management	Technology cautious; no-till agric.; soybean for soil correction; plants palm trees	Technology intensive, no-till, precision agriculture	Use of old machinery, semi no-till agri.,diversified	Diversified, soybean integrated with other farming activities, for soil correction, and feed, mini agro-enterprise	Highly diversified, agroecological, mini agro-enterprise
Agrarian dynamics	Capture market, involved in governance of farming, land concentration, forest for carbon market	Unsustainable rapid expansion; land concentration; decapitalised; labour management changes; workers opportunities.	Differentiation as capital increases; land use change in old extensive cattle ranches towards intensification	Search of alternative crops to diversify, land lease from large and small-scale farms.	Occupation of LRS by non selected beneficiaries (invasion)	Breaking even with soybean production in family farming, land accumulation and renting within LRS	Soybean integrated in diversified production of family farming. Soybean as a safe income source.	Reproduction and adaptation of family farming of southern Brazil

Case one: Mega-large scale farm

Image 5.1 Corporate Image of Grupo André Maggi

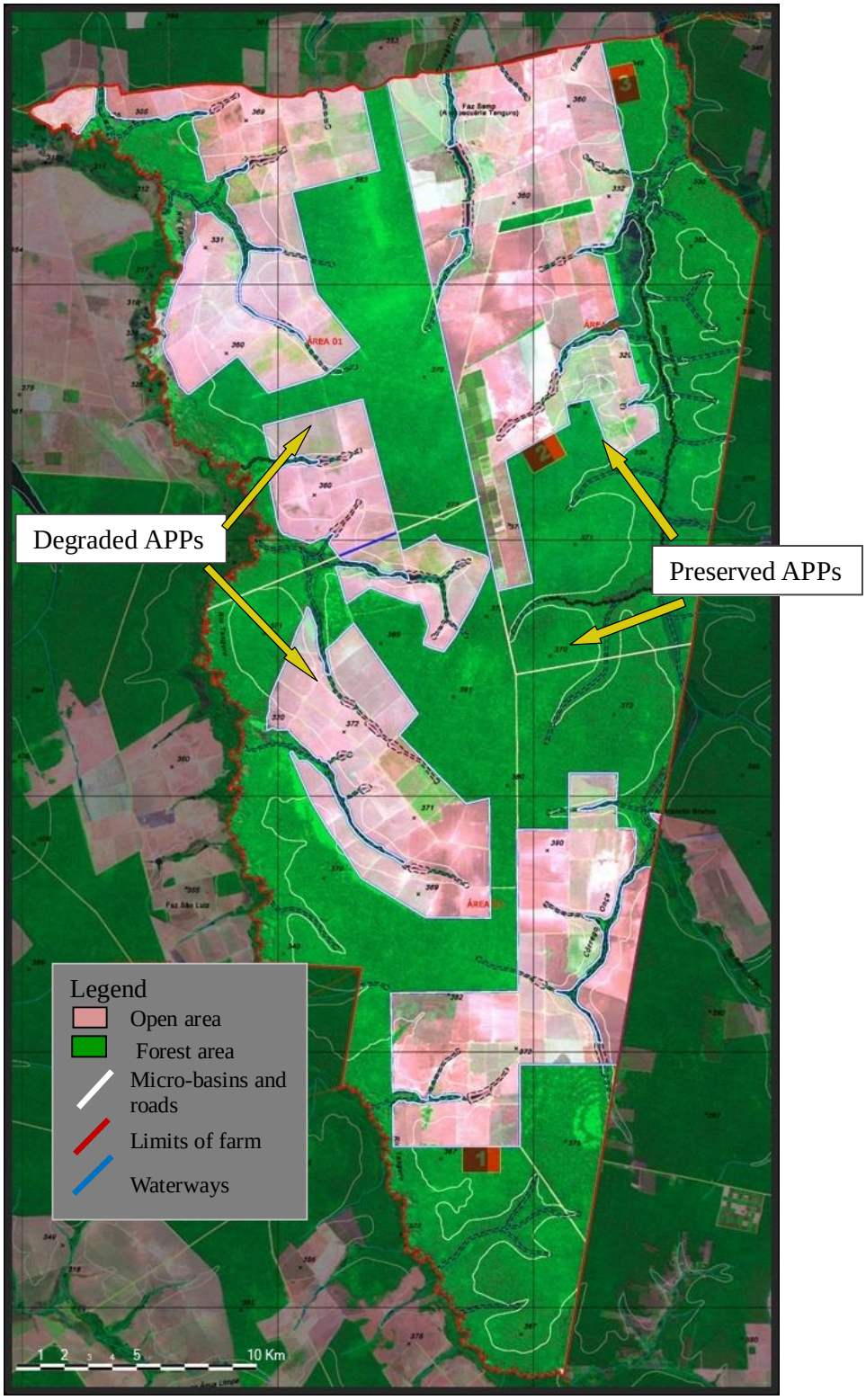
Fazenda Tanguro, Grupo André Maggi

The Grupo Andre Maggi "is a separate thing", a farmer in Querência commented as a way to differentiate the styles of farming in the municipality. Within Querência, Maggi Group is a slightly exceptional case, partly because is both a grain trade corporation and an owner of large-scale farms, but also because is by far the biggest and most capitalized soybean producer. This is a case study of the farm the corporation has in this municipality, the *Fazenda* Tanguro (Figure 5.1), classified here as a mega large-scale farm (more than 10,000 ha).[74] A brief history of the Maggi Group from its beginning to the time they bought the Tanguro farm is presented as a life history. Then the farming style practised on the farm is described, tracing the recent changes in land use. This includes the adoption of precision agriculture, as well as the compliance with the Brazilian Forest Code. A last section situates the agricultural practices in relation to broader agrarian dynamics related to labour, consolidation of market power, and expansion through contract farming.

In 2002 the Brazil based corporation Grupo André Maggi, through its Agropecuaria Maggi Ltda (AgroDivision), bought *Fazenda* Tanguro and converted it into the largest soybean farm in Querência (see Image 5.2). This became the group's biggest farm in Mato Grosso (see Appendix Two). In 2010 this farm extended over 80,863 ha, with 30,747.7 ha of soybean planted – the second largest farming "explored area" among the 12 farms the group operated –[75] and 46,655.27 ha of forest Legal Reserve and Permanent Protection Area plus 282.16 ha under recovery, which totals 58% of forest cover in all – the largest forest the group owns (see Appendix Two; Grupo Amaggi 2011a, 8; RTRS 2011; Chiavarini 2011). The farm is run by a manager, who reports to a centralised structure with head-quarters in Cuiabá-MT. It is run with around 210 workers, each with defined labour activities (Diário de Cuiabá 2007). The soybean production is highly mechanised, combined with same year planting of maize or other crop cover for no-till agriculture. The farm also leases to a third person 1,000 ha for a rubber tree plantation, which was established before the corporation bought the farm.

[74] Also registered as Agropecuária Morro Azul Ltda.
[75] The total explored area is of 33,925.55 ha (42%), which also includes rubber tree plantations, pasture, and the farm infrastructure.

Figure 5.1: Map of *Fazenda* Tanguro owned by Maggi Group in Querência



Source: IPAM in Mendes de Oliveira et al. (2010, 15)

Image 5.2 Tanguro Farm, Maggi Group, Production Unit, Querência-MT, Brazil.

Note: The picture shows the *sede* (homestead) of the farm with workers' housing and the silo. It is surrounded by its Legal Reserve of native forest. The dirt road leads to Querência and Canarana. At the top right corner there are plantations of rubber trees and further on the horizon, soybeans.
Source: (Grupo Amaggi 2011a, 41)

For the group the Tanguro farm "is an example of productivity and compliance with the environmental legislation" with a productivity record in 2010 of 62 sacks of soybean per hectare and the ISO 14001:2004 certification (Grupo Amaggi 2011a, 41).[76] It is their showcase of sustainable practices and the way the company has progressively moved to incorporate socio-environmental concerns. The *Fazenda* Tanguro, together with *Fazenda* Tucunaré owned also by Maggi Group, are publicised as the first farms in the world to have acquired the RTRS certificate (Instituto Ethos 2011, 9). Indeed, in 2010 it was expected that about 115,000 tons of certified soybean would be produced in the Tanguro Farm – 25% of Maggi Group's total production and 2.9% of its total soybean trading.

Moreover, in 2005 Maggi Group opened a warehouse with the storage capacity of 60,000 tons (Image 5.3) near Querência's urban centre.[77] With this unit Maggi Group had 26% of the municipal storage capacity. By then it had amassed 22 warehouses of its own and 18 leased ones (Grupo Amaggi 2005). It is from these units that Maggi Group

[76] The average soybeans productivity in 2010 was of 52 sacks for the group and 50 sacks for MT (CONAB cited in Grupo Amaggi 2011a). Each sack contains 60 kilos.
[77] Interview with João Shimada, Corporate Environmental Supervisors, Grupo Maggi, 30th June 2010, Cuiabá-MT

forges relationships with other soybean producers, selling them inputs, and financing and buying their production.

Image 5.3 Grupo André Maggi's Warehouse in Querência

Source: Villela (2005)

As stated in a publication by Maggi Group (2004c, 22), their aim is to become a "global player" in the market of soybeans:

> The expansion of production and commercialisation of soybeans is the main strategic aim of the Amaggi Group that aims to consolidate its position as global player in the market of this commodity. For this, in the future the group will have to expand its own areas of production and strengthen the purchase and trading of soybeans from third parties [...] The expansion of logistics infrastructure and storage facilities is part of the strategic plans, aiming at reducing both the costs of transportation of soybeans and by-products as well as fertilizers and other important inputs.

Life history

The history of Maggi Group starts with the history of its founders André Maggi and his family, amongst them his wife Lúcia Borges Maggi and his son Blairo Maggi. Theirs is a story of migration from the south to the north of Brazil, which has been a common trend amongst most soybean producers, and forms part of the pioneers' story at the agricultural frontiers, and of the gaucho identity in Mato Grosso (Rebello da Silva 2004; Savanachi and Netto 2010). The Maggi family migrated in 1955 from Torres-RS to the village of Gaucha in Paraná in search of better opportunities and land. In their first years André Maggi worked in a timber mill, where he was promoted to manager. Then after

few years they were able to buy a rural property that had a small timber mill, the *Fazenda* São Miguel (Silva 2000). The purchase of land, according to Silva (2000), allowed the Maggi family to return to their original activity, agriculture, and over time to buy more land from small-scale farmers. At the beginning of the 1970s, when timber extraction started to decline as a viable business, André Maggi sold the timber mill, so the Maggi family turned full time to agriculture. They were, Silva (2000) explains, pioneers in mechanised agriculture in the region, and later became providers of agricultural inputs for other producers.

In 1977 the seed company Sementes Maggi was founded in São Miguel do Iguaçu-PR. It became the base to create Grupo André Maggi (Silva 2000). By 1979 it was well enough established to expand to the south of MT, to the municipality of Itiquira-MT, 140 kilometres south of the city of Rondonópolis-MT. There they bought their first Mato Grosso farm, of 2,400 hectares, today called SM1 (Silva 2005a, 6). By then soybean was already the main crop managed by Sementes Maggi. However, at that time agricultural production in the micro-region of Rondonópolis was rice. Later it became a soybean production and processing region. Today farmers there are specialised in soybean seed production and have most of Mato Grosso's soybean processing agroindustry.[78]

According to Silva (2005a), it took the Maggi family 3 to 4 years to make soybean production a viable crop in the SM1 farm. There were no seed varieties adapted to the region, the best time for planting and the quantity of lime stone to correct the acidity of the soil were not known, and the storage infrastructure was still geared to rice trading. This meant that the first harvest of soybeans was not satisfactory. However, it was the venture into soybean production in MT, that allowed André Maggi become a key actor in advancing the agricultural frontier in the Cerrado (Silva 2000), and more recently in the Amazon, particularly in the transition areas of these ecosystems. In the 1980s Sementes Maggi expanded on various agricultural fronts and diversified its activities (Silva 2005b) becoming the Grupo André Maggi.

[78] Interview with Nery Ribas, APROSOJA, 29th June,2010.

The formation of the Maggi Group is interrelated with the Maggi family involvement in politics. As pointed out by Silva (2000) the ascendance to a better economic position, which included hard work and difficult periods, was paralleled by the construction of leadership in the locality. André Maggi became a leader based on his socio-economic position and charisma but also his political leadership in the municipality of San Miguel de Iguaçu (Silva 2000). In Mato Gross the Maggi family participated in a private colonisation project, and later founded the municipality of Sapezal. It is from this municipality that the group has built control of a non-GMO soybean trading circuit that goes west to the river port in Porto Velho, ships the crop up to Santarem and exports it to European ports.[79]

The participation in politics is repeated in the case of Blairo Maggi, who escalated to state and national politics. He was born in 1956, the last son of André and Lúcia's five sons, in Torres, Rio Grande do Sul, and registered in São Miguel do Iguaçu, in the state of Paraná (Gomes 2002; Silva 2000). In Blairo's own words, he comes from a "family of small rural producers of Italian descent" (Maggi 2011). He started working on his father's farms at an early age, and graduated in 1981 as engineer agronomist from the Federal University of Paraná (Silva 2005a, 7; Damiani 2003). He was president of the Fundação Mato Grosso (Fundaçao-MT)[80], and became director of the Maggi Group. Currently he is the main shareholder of the group. He is married toTerezinha Maggi and has three children. In 2002 he entered the electoral campaign for state governor. He occupied this post in January 2003 till 2010, with a re-election in 2006. It was in his first year of governor that environmental groups fiercely denounced the increase in deforestation in the Amazon as a world threat (D'Avila 2003). In 2011 he was elected federal senator (2011- 2015).

The following words by Blairo Maggi (cited in Borges Neto 2011, 1 Translated) synthesize his narrative as pioneer and his view that the government incentivised deforestation, and therefore should recognise the migratory past and consider it in a vision of sustainable development:

[79] Ibid.
[80] A leading private research company crucial in the diffusion and innovation of technology for soybeans production in the state of Mato Grosso (Nassar and Kikudome 1998).

> I'm a product of that struggle for the land. My family migrated from Rio Grande do Sul to Paraná and then we came to Mato Grosso to plant, within a government policy that incentivised the opening of areas. The forest code needs to take into consideration this historical context. Having also a vision of the future, in which is possible to combine economic development and sustainable development

This narrative reflects the approach taken by Maggi Group in shaping their farming style, a combination of "economic development and sustainable development".

Farming Style at Tanguro Farm

The *Fazenda* Tanguro is located between the cities of Querência and Canarana, at 40km from the first and 90km from the last; at kilometre 104 of the MT-320 highway (Villela 2005). The MT-320 is one of two wide, two-track dirt roads that connect the urban centres of these two municipalities. The *fazenda* is few kilometres south east of the Xingu Indigenous Park. It is between the Tanguro and Darro rivers, both tributaries of the Xingu River, which is itself a tributary of the Amazon River. Moreover, it is the only farm the corporation reports as being located in the Amazon Biome (Grupo Amaggi 2011a). However it has also been classified as in a transition area (Mendes de Oliveira et al. 2010; Chiavarini 2011). In an interview Blairo Maggi described it as the "best area" for increased soybean production in Brazil, although "this can be left and the focus should be degraded areas" (Maggi 2011b min. 8). These last words echo with what happens on the *Fazenda* Tanguro. According to the Control Union Certifications – who audit for the RTRS – since the group bought the Tanguro Farm no major forest clearance has been done in it (RTRS 2011). The increase of soybean production area has been done by replacing pasture.

The soybean plantations are managed by a no-till system, with some sections having a same-year rotation of maize or another crop, such as millet. It is a highly mechanised and intensive style of farming which includes high usage of fertilizers and agrochemicals for pest and weed control. Productivity is the main concern, but according to the corporation achieving higher yields goes hand in hand with various practices that can be considered environmentally sound (RTRS 2011, 4):

> Some agricultural techniques are applied to maintain productivity. Among the agricultural techniques used at the farm we can mention the use of genetically resistant agents to monoxenous and other parasites, tillage techniques, rotation of crops, soil analysis, controlled agrochemical

> applications, use of topographic contour lines, cover crops (800 ha of Crotalaria, 800 ha Brachiaria and 8000 ha of Millet), monitoring crop analysis to decide the agrochemical application strategy, personnel training on monitoring of pests and beneficial predator animals, soil compactation measurement, etc.

This list of farm practices delineates what can be considered a style of farming where experimentation is part of the production process, and reflects their search for sustainable agricultural practices within a technological parameter viable for large-scale production.

A key component of Maggi Group's farming style is the use of machinery. As a corporate group they are proud to position the *Fazenda* Tanguro as a "state of the art" farm implementing precision agriculture (Grupo Amaggi 2011a, 42). Maggi Group states that "this technique aims to match production increase with production cost reduction and environmental impact mitigation", as it is a practice associated with better soil management and reduced use of inputs (2011a, 42). In 2010 Grupo Maggi renovated its Tanguro farm fleet, "16 brand new seedling machines were incorporated into the activities of the company, the biggest-ever acquisition operation in the world so far" (RTRS 2011, 4). This purchase became a media event in the region as well as in the state (Sergio 2010), adding imagery of the increasing scale in which Grupo Maggi is engaging. Moreover, as documented by Control Union Certification, Maggi Group's acquisition of this machinery corresponds to the corporation's "transition to applying precision agriculture practices in all the plantation areas [in the Tanguro Farm]" (RTRS 2011, 4).

The portrayal of Tanguro as a farm with this agricultural practice situates the Grupo Maggi as engaged with capital intensive and information based technology, that arguably cuts production costs and reduces negative environmental effects (Pardey, Alston, and Piggot 2006; EMBRAPA 2012). The implementation of this agricultural practice can be considered another of the strategic experimentations the group engages in, as they have not applied it to all their farms. Moreover, it implies that the company hires highly specialised rural workers to drive the machinery and GPS, and agronomists that analyse the data gathered. Its actual effects on the environment and implications for labour, such as workers' specialisation and reduction of numbers of jobs created, are

contested issues yet to be assessed (Shiki 2000; Aracri 2012). Meanwhile, Maggi Group, as a mega large-scale producer advocates its use as a state of the art technique.

The 33,925 ha of open area in the Tanguro Farm were mostly cleared for cattle ranching before Maggi Group bought it in 2002 (RTRS 2011). Some riparian forest was cleared by previous owners to make water accessible for the cattle. In 2004 – at a time when it became clear to the corporation that it wanted to be a leading reference for responsible environmental and social practices – Maggi Group engaged in a series of partnerships with NGOs, such as IPAM, that has led to environmental practices, particularly the recuperation of the APPs of the farm (Iriani 2007). APP restoration was required to comply with environmental legislation, particularly the Forest Code and the environmental permits for its farm under the Unified Environmental Licence (LAU in Portuguese) (Grupo Amaggi 2004a). Indeed, the company does not hesitate to announce its reforestation work in the APPs (Villela 2005, 4). In the farm's first "Responsible Soy Production Certification Report" it is highlighted that "for the purpose of recovery, a greenhouse was built for the native tree seedling production. Around 50,000 to 60,000 trees have been produced and transplanted annually (in an average range of 1,000 trees/ha)" (RTRS 2011, 4).

The environmental and social practices that the Grupo André Maggi has started in the Tanguro Farm have become essential for obtaining socio-environmental certifications, such as the ISO 14001 and the RTRS and Protegra certifications (see Appendix Three), situating the group as a global firm with 'good agribusiness practices', and the Tanguro Farm as "a laboratory of best practices" (Nepstad 2007, 22). These awards have credited the firm with legitimacy to talk about sustainable agriculture. The Grupo André Maggi has become a leading actor in the contested definition of sustainable soybean production. However, its efforts have not been enough to respond to criticisms of its farming style, such as reducing biodiversity through large fields of monocrop production, land concentration, indirect incentives to further expansion of soybean production in the Amazon Biome, and increasing the environmental and social impact of the overall soybean agri-food system (see Chapter Three).

Moreover, these certifications are also anticipating the creation of a carbon credit market in which the 46,266 ha of forest held as its Legal Reserve could be a profitable

business. Although the payment of farmers in Brazil for environmental services is uncertain, Blairo Maggi is a leading advocate of creating compensation mechanisms. In 2009, whilst at the United Nations Copenhagen Climate Change Conference (COP15) to propose a mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD), he declared that "farmers and livestock breeders have been doing the simple count of opportunity costs of preserving the forest [...] we have the expectation that forest will be worth more", potentially making forest conservation a profitable agribusiness (Prado 2009, 1).

Agrarian Change

As a mega-large scale farm, the *Fazenda* Tanguro causes greater direct effects than any of the other farm cases presented in this chapter. Moreover, as a corporation that incentivises further increase of soybean production, it has a critical role in defining the agrarian change in the localities where it is present. Its highly mechanised farming style is associated with low levels of employment creation, although in Querência it is one of the largest employers. Its demand for workers with specialised skills contributes to a migratory flow to the municipality. The company has a policy of employing people living in the municipality, but still it does not find all the skilled labour required (Carneiro and Werlang 2006). For some this creates synergies, as in the case of restaurant owners whose clientele increases during the workers´ rest days, or soybean producers that hire "well trained workers" who have left Maggi Group.[81] Likewise, the corporation contributes to the increase of temporary workers who try to stay in Querência town when their work ends. These then join the low income population on the outskirts, creating pressure on housing and the general planning of the town.[82]

Moreover, as a corporate group in search of market share, the presence of Maggi Group is seen in the provision of inputs, services, and trading relations established with other farmers. Through contract farming the company establishes a governance relation with producers. It is particularly with those whose production is pre-financed that the corporation creates a tighter governance relation and influences their farming practices (Grupo Amaggi 2004c; Maggi Ribeiro 2007). In its search to expand the Maggi Group

[81] Interviews with Querência farmer, 2010.
[82] Interview with civilian in Querência, 2010, and observation in situ.

becomes an intermediary of financial institutions, such as the International Financial Corporation (IFC), and makes financial resources accessible to farmers who are willing to engage in particular agricultural practices, for example using the agrochemical inputs that the company provides (van Gelder 2004). As often the contracts involve payment with soybean, this assures the group a minimum percentage of the soybean produced in the municipality.

This outgrower type of arrangement is not exclusive to large-scale farmers (Table 5.3). From the data it is possible to see that small-scale production is a significant part of the company's pre-financing contracts. In 2010, 14.1 percent had properties of less than 50 ha. Moreover, the involvement of farmers with less than 500 ha grew from 153 in 2004 to 463 in 2010 (61.5% of the total producers in the last year). These figures reflect the interest of Maggi Group in consolidating its market power by capturing a market share independently of the size of the properties in which soybean is produced. However, the increase in small and medium-scale pre-financed producers may relate to the corporate advances in new soybean agricultural frontiers, where it incorporates medium and small-scale producers, as is the case in Rondônia (Jepson, Brown, and Koeppe 2008) and the Low Araguaia, including Querência. The concentration of land associated with the ever larger-scales of soybean production creates socio-economic tension in these areas. Nevertheless, in Querência, the push for economies of scale promoted by corporations is not the only factor defining scales of soybean production. As the cases presented below show, alongside the formation of middle and large-scale farms, there are small-scale farmers producing soybean in LRS, whose scale relates better to their capital and access to land.

Table 5.3: Distribution of Maggi's pre-financed producers according to size of property

Pre-financed Producers 2003/2004[1]

Size of Property by Hectare	Number of Properties	Percentage
1-99	27	5.5
100-199	30	6.1
200-499	96	19.4
500-1999	212	42.7
2000- or more	130	26.3
Total	495	100

Pre-financed Producers 2009/2010[2]

Size of Property by Hectare	Number of Properties	Percentage
< 50	106	14.1
50-500	357	47.4
500-2,000	218	28.9
2,000-10,000	67	8.9
>10,000	5	0.7
Total	753	100

Comparable distribution of size of properties

	2003/2004		2009/2010	
Size of Property by Hectare	No.	%	No.	%
<500	153	31.0	463	61.5
500-2,000	212	42.7	218	29.0
>2,000	130	26.3	72	9.5
Total	495	100	753	100

Source: Arranged by author with data from 1) Grupo Amaggi (2004b, 10) and 2) Shimada (2010, 18)

Case two: Large-Scale Farmer I

Image 5.4 Harvesters in the Kurtises' *fazenda*

Igor Kurtis (b.1955) and Carol Kurtis (b.1962)

Igor Kurtis and Carol Kurtis are farmers who travel far to their two farms. To get to their 10,000 hectare *fazenda* Igor drives his four wheel drive for 2.5 hours within Querência, along 80 kilometres of dirt road. The farm comprises 3,400 ha of soybeans, the rest being forest (see Figure 5.2). To get to their 20,000 hectare *fazenda* he drives the four-hour, 220 km trip to the neighbouring municipality, Riberão Cascalhiera. Here they breed cattle on 4,500 hectares of pasture – 5,000 heads in 2010 – and maintain a 14,500 hectares forest reserve. The farms were managed with temporary and permanent *funcionarios* (workers), 12 and 9 respectively in 2010. In terms of machinery, this year for the soybean farm they had two planters, three harvesters, a recently acquired elevated sprayer – or self-propelled sprayer – two tractors, a *bazuca* grain collector, a motorcycle for the manager, a truck, and extra equipment. The farm also had a 500-ton silo with additional infrastructure to dry the harvest and store it to the standards required by the processing industry. Generally speaking each machine had an assigned employee, but depending on the workload and whether machines were available or under repair, workers were asked to engage in different activities to those defined in their contracts.

Figure 5.2: Map of Large Scale Fazenda in Querência – Satellite Image 2008

Notes: Border in red is the 10 x 10 km farm; in pink is the "cleared" area (26%), in green the forest cover.
Source: Provided by the farmer, satellite image from LANSAT (13-09-2008).

The Kurtis's trajectory is one of risk taking by investing in additional land in regions where it "was still cheap".[83] Moreover, adopting innovations to intensify production has been critical in their accumulation of resources and success in consolidating profitable farms. By 2011 their soybean farm was a decade old. Igor and Carol's soybean farming in Querência is an example of the increase of soybean production through land expansion, which characterized the dramatic increase of production of this crop in the municipality during the 2000s (see Chapter Four). The process shows how fast a farm can be started, but also the risks and uncertainties involved. Their farm is situated in an area that was mainly forest – in the northern part of the municipality. The 26 percent of the property that is open was all cleared in the first year. Also neighbouring plots had been converted into soybean *fazendas.* However, these are still surrounded by forest. The Kurtis´s soybean farm is located at the very agricultural frontier of the municipality.

This case is studied first in relation to how Igor and Carol followed a trend of migration to a region where large areas of land could be bought relatively easily, at a price they could afford. They saw an opportunity to increase their wealth and scale of farming by buying land in Querência. Igor decided to dismantle and sell their farm in the state of Goiás at once, rather than move "gradually" as Carol would have wanted, as a prudent strategy. By 2010, the state of their farms was, according to Carol, financially unstable, it was not "consolidated".[84] The second section analyses the farming style: first according to the way the forest was cleared on their soybean farm and how the farming activity started, as this tells a story of a fast landscape transformation that marked the 2000s in Querência; second by the farming practices for soybean production, which are geared to intensification within the parameters of mechanised cash crop farming, with no-till and consecutive cropping of soybean and maize in the same agricultural season; third in relation to the particular labour management required by their scale of production; fourth by examining their ownership of a silo and relations with corporate actors that differentiate the Kurtis's farming style in their relations with traders and in having an extended actor-network.

[83] Interview with Igor, 9th February,2010.
[84] Interview with Carol, 5th June,2010

Life history: following the soybean agricultural frontier

Igor comes from a family of farmers. When he was born, in the USA, his parents were already producing soybean and wheat as well as breeding livestock. Since then they have farmed the same land, on which they still live (2010). For Igor by planting soybean "I'm following a family tradition".[85] In 1973, aged 18, Igor migrated from the USA to Brazil where he began to work for other farmers, first in São Paulo, then in Parana and Santa Catarina. With initial financial help from his father he then bought 200 ha of land in Santa Catarina. In 1981 he moved to Goiás where he bought 500 ha. It was in this state where he met Carol, who belonged to a family of cattle breeders. By 2001 they had 3,000 ha.

Before Igor and Carol moved to Querência they did not intend to expand their land. They already had a well established and profitable soybean farm in Rio Verde, Goiás. However, as Igor recalls, "I first visited Querência in 1998 with friends who had moved from Goiás" and bought larger areas of land.[86] In 2000 another close friend, Joel, saw an opportunity to buy land in Querência that according to Igor "could not be bought at the same low price in many more places".[87] What was offered to Joel was more that he could afford, so "I [Igor] decided to enter the deal and buy land", a 10,000 ha area of forest (Figure 5.3).[88]At that time access to land was not through the State or COPERCANA as it had been some decades earlier (see Chapter Four), but instead there was a lucrative land market run by the private sector. As far as Igor has traced the history of his plot, the land was owned by an international bank. Around the 1980s there was an auction and it then went to the colonisation cooperative COOPERCANA (see Chapter Four). When this cooperative went bankrupt the plot ended up in the hands of a land dealer, from whom Igor bought it. He mentions that the land "went from R$50 per ha in 1999 to R$150 and then I paid R$250 per ha in 2002".[89] He believes that today only companies can afford to buy areas of that size.

[85] Igor Op.Cit.
[86] Ibid.
[87] Ibid.
[88] Ibid.
[89] Ibid.

When they bought the land in Querência in 2001, Igor spent the first years living on the farm and going back and forth to Goiás. However it was difficult to travel so much and he recalls, “I needed Carol’s help with the administrative side of the farms”;[90] so Carol moved to Querência. Of their five children, the two eldest, a man and a woman, work in non-farm activities; the third child, aged16, lives on the cattle farm and helps with the management. The two youngest children, a son and a daughter, live in Querência with them. The boy is keen to become a farmer, always getting involved with the duties of the farms when he is not in school. The farms are an integral part of Igor and Carol´s life. These are not only a financial investment, but are managed within a household livelihood strategy. Igor has planted soybean for many years and expects "they [their children] will take over the farms, I’m getting old”.[91]

Igor and Carol arrived in Querência via a network of relatively highly-capitalized farmers that could clearly see that soybean production could be a profitable investment. This contrasts with other farmers that arrived earlier through the COPERCANA colonisation project, when the context was not yet clearly adequate for soybean production. Igor was convinced of the potentialities, imagined a future of better opportunities towards which he is working, and convinced Carol to adventure in creating a much larger agro-enterprise than they already had. They arrived in a moment when the value of land was starting to go up, and some of the large holdings created in the 1960s were fragmented to make them accessible to large-scale farmers (see Chapter Four).

Their life history seems to reflect that of farmers who have successfully accumulated wealth through increasing their scale of farming. However, moving to the frontier has involved changes that affect and challenge their way of farming. The family’s lifestyle changed, as Carol recalls: Querência “[…] does not have all the services developed; in Rio Verde, Goiás, the schools, banks, roads, supermarkets, hospitals are more developed”.[92] Moreover, the purchase of the two farms involved selling their financially stable agribusiness in Goiás. This double decision, selling their assets and a sudden increase in area, put them in a situation in which they have to rely more on loans from

[90] Ibid.
[91] Ibid.
[92] Carol Op.Cit.

financial institutions and input providers, including tractor companies. In addition to the large scale per se, these financial relations create pressure to have a management structure for administering the multiple tasks in a large agro-enterprise, including labour and its specialised activities. As Carol commented, "neither of us are accountants; Igor needs to hire a professional".[93]

Farming style: from clearing forest to production intensification

Carol and Igor's farming style corresponds to the trend of increasing scales of production. One aspect is the increase of the land. The size and speed at which they 'cleared' the forest reflects the low value placed on trees relative to their project of planting soybean. Other aspects are adjustments and acquisitions of infrastructure and machinery, and administration of labour, and also an extensive network of actors related to their farming scale. The organisation of labour follows the pattern of corporate farming, with specialised workers, and contractual relations captured in the system of clocking in and out. Moreover, their farming style is also shaped by having a silo, a vertical integration that adds the capacity to take the first steps of soybean processing on site, as well as to have a different relationship with soybean traders. Igor maintains the relations that he established with input providers, financial institutions and commodity traders in Goiás. In this sense the Kurtis´s network of relations for soybean production is extensive – reaching actors beyond Querência – differentiating their farm style from other large-scale farmers, such as the Oshemback case presented next.

The Kurtis bought their land to produce soybean, so forest had to be cleared. In the first years, 2001/2002, "more or less 3,400 ha were cleared", Igor mentioned.[94] At that time the general understanding among land owners was that "what you clear will not grow back",[95] meaning that once the forest was cleared the government could not stop the farmer from using the land. Igor remembered that in the period in which deforestation was at its height, "during 2000 there were still some tractors in the municipality – Crawler Dozers – that were used to drag the *correnton* [a heavy chain pulled by two bulldozer tractors in order to tumble the trees to clear forest]".[96] This type of tractor

[93] Ibid.
[94] Op.Cit.
[95] Ibid.
[96] Ibid.

stopped being common in the municipality once the illegal saw mills were closed down; "[...] the owners have moved to other regions where deforestation is taking place" Igor claims.[97] After dragging the chain the next step is to burn the felled trees. Then whatever trees and roots are left are moved to the sides, creating rows to plant rice in between. In the following years they burned or removed what was left of the forest in the piled rows, clearing and levelling the whole field to start planting soybeans. This story describes a time where more than one land-holder was clearing land, creating a temporary economic activity around deforestation that involved hiring labour. In addition, Igor's case resembles the short time that was used to clear large areas of forest with the sole purpose of establishing a large-scale soybean farm. This poses questions about the socio-economic and environmental sustainability of the process, as with less urgency of deforesting and some forest management the farmers could take more advantage of the forest resources, and still establish a farm.

The mechanic that works for the Kurtis has worked for them since the beginning. From his perspective clearing forest "was an arduous job [...] under difficult conditions".[98] He remembered "pulling the *correnton* and whatever came in its way with the heavy machinery was a dangerous activity".[99] They often had no communication between drivers and could not see each other through the forest. "When large trees were not toppled solely by the force of the two tractors pulling the *correnton,* single trees had to be brought down by pushing them from a high point, but the machinery could be lifted into the air by the roots of the tree", the mechanic recalled.[100] Burning the forest was also considered a tough job. The employee remembers that "the fire was very hot and they did not have much protection".[101] In this process the timber from the "opened" area was not sold to sawmills: "it was burnt", Igor confirmed.[102] At that time there was a hurry to bring the soil to a condition needed to produce soybeans. "We did it all at once", Igor recalled.[103] The way the forest was 'opened' reflects on one side the great speed at which it was done, but also a situation in which the timber as a natural resource was not used.

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[97] Op.Cit.
[98] Interview with worker-mechanic, 26th Feb,2010, Querência
[99] Ibid.
[100] Ibid.
[101] Ibid.
[102] Igor Op.Cit.
[103] Ibid.

The shape of the opened area is a square (see Figure 5.2), reflecting a relation with the forest as well as the notion of how large scale soybean production is meant to be done. The previous owner had a land keeper living in the area, in order to secure it from potential squatting. This person had a wooden shed and less than one hectare of cleared area to produce some food and keep some animals to live under subsistence conditions. During the clearing of the forest this shed became the homestead of the farm. Later Igor established the *sede* at the side of the property closer to the town of Querência. As Igor remembers "we did not know the land, we opened what was accessible. Later I realized that I chose the wrong place".[104] Once the neighbouring land owner opened a road further north to access a property – a 30,000 ha area – "I was able to explore what was on the other side of the stream [...]a flatter area with a clayish soil more suitable for soybeans".[105] However this area is now registered as his forest Legal Reserve, which he is not allowed to cut down. Referring to the amount of forest he is allowed to clear to profit from agricultural activity and the fact that he is producing on land that is not the most productive, he mentioned jokingly that "it has been expensive to clear cheap land".[106] Igor recognized that if he had been more strategic he could have explored his property more and deforested better areas for soybean plantations. This might have involved taking into account other criteria, such as the proximity to water bodies to avoid deforesting the APPs. However, expressing his view, Igor put it bluntly: "I bought the land to plant soybean, not to do forest management".[107]

In 2010, to comply with the federal Forest Code regulations, as well as requirements by private initiatives – in particular Rabobank from where the Kurtis get agriculture loans – they had to commit to reforest 6% of their property, that is 600 ha of the 26% of all the holding that was deforested back in 2001. Most of the area that needed reforestation was left idle to recover with no intervention, but some of the missing riparian areas (APP) were in process of restoration with seedlings and also ISA's mechanised reforestation *muvuca* (see Chapter Four). Furthermore, Igor and Carol have started a project of forest management to be able to exploit certified timber. This project was by 2010 only at the proposal stage. They paid a forest engineer to present a project for 100ha. For this, trees that could be felled were located and marked. The proposal establishes a long-term plan

[104] Ibid.
[105] Ibid.
[106] Ibid.
[107] Ibid.

of sustainable management according to government regulations. However, for Igor this economic activity was not a priority as "it required a high initial investment" that he considered could go to the soybean and cattle activities that he already has, and to the infrastructure of the farms, which require further investment to comply with labour and construction laws.[108]

The plantations in the Querência farm started in 2002 with two years of rice after which soybean was planted. The planting is done with no-till farming, and since 2008 Igor decided to plant maize in parts of the area as a second crop after soybeans– a practice associated with intensification of land use. Every year he plants a different area with maize so it also works as a rotation system to manage the soil. By 2010 the areas had been planted with soybeans for one to five years. Hence the planted area was divided into plots that were treated – and have developed – differently. For example, Igor uses soybean varieties that are differentiated according to their adaptation to old and new soils. Also "older areas tend to respond differently to weeds, fungus and diseases [so] the use of agrochemicals varies", Igor pointed out.[109] Furthermore, "there are areas that tend to get flooded"; for this he has dug canals to channel the water, but not everywhere, so there are still spots where the water accumulates and "hinders harvesting".[110] For this area he plants varieties that grow taller to facilitate the harvesting – the cutting is at a higher level and mud entering the machine can be avoided. The multiplicity of factors that have to be considered in Igor's soybean plantations implies a dynamic relation in which multiple decisions have to be taken every year. It is in this sense that the relation of Igor with the soybean fields is one where he has to frequently visit the areas to supervise and take decisions on production procedures. Furthermore, the fact that the field is subdivided into smaller areas reflects a more complex planting practice than that behind the common notion of homogenous monocropping.

As there are daily decisions that shape farming practices, there are other long term decisions that define the farming styles. Other than continue with no-till agriculture and intensify production with double-cropping, the Kurtis are faced by alternative practices that they have not yet adopted, such as iLPF, or procuring a certification of socio-

[108] Ibid.
[109] Ibid.
[110] Ibid.

environmental responsibility. As John Landers – a renowned promoter of no-till agriculture in Brazil and participant in the RTRS – recognized, when Igor was in Goiás "he was a pioneer in the use of no-till agriculture".[111] However, as he remarks, "no-till agriculture spread because there was an economic benefit for farmers.The new initiatives of responsible production will take time as there are no clear economic advantages for the producers".[112] Igor is familiar with both the certification schemes and the general notion of integration of soybeans, pasture and forest management, as he access discussions in the media directed to producers and has followed the demonstration unit that Embrapa has in Querência. Having in mind one of the aims of iLPF – recuperation of degraded pasture – "we are planting soybean on the cattle farm to improve the soil conditions and replace old pasture with new grass, to have better feed and improve the cattle".[113] However, he has concluded that "the soil of this farm is not so good for soybeans".[114] Furthermore, the distance between the two farms, and the fact that one of these was already established as a cattle farm, has made them decide to specialise each farm in one activity. Their decision of not pioneering with iLPF, joining a certification, or investing in forest management, is associated with the large amount of capital required to keep their scale of production, which makes any other expenditure a burden. In short, they have sunk their capital in land and do not have enough available to invest in new agricultural practices.

Igor and Carol hire a combination of temporary and permanent workers. The permanent workers tend to do the specialised jobs, as is the case of the *gerente da fazenda* (farm manager), the mechanic and cattle ranchers. In the case of the soybean farm, most of the workers were hired only for the *safra* (farming season), which in Querência takes place from September to April. As they converted more area to soybean, and acquired new machinery, the number of permanent workers augmented. However, by 2010 Igor was not planning to buy more machinery, and the agricultural area in the soybean farm was at its legal limit, so he was expecting to have a stable number of workers. He had then a total of 21 workers. The administration of different contracts and salary arrangements, and the infrastructure adjustments to comply with labour legislation, occupied a good deal of the Kurtis' time when on the farms. Contrary to Grupo Maggi that has – besides

[111] Interview, 27th July,2010, Brasília.
[112] Ibid.
[113] Interview with Igor, 4th June,2010, Riberão Cascalhiera-MT.
[114] Ibid.

agricultural technicians to manage the farm – an administrator for the farm, Igor and Carol were struggling between the agricultural and the administrative management of the farm. The organisational changes that a larger-scale farm were demanding affected their life style and farming practices, e.g. they needed to do more paper work. The number of workers and increase in activities require the organisation of labour with a degree of division of labour. The case of the technical farm manager and the mechanic give an idea of this process.

The Kurtis´s large-scale, industrial-style farm required a farm manager, which says something about the process of labour specialisation as well as working dynamics. The farm manager is expected to master the technical and agronomic aspects of the crop, the use of machinery, and management of workers, among other things. The farm manager mediates between workers and the farm owner, generally creating hierarchical relations. This requires from the farm manager, among other things, an ability to deal with people. Igor's farm manager, Niko Alexander, had worked on *fazendas* since he was 14 years old. In recent years he had moved to various farms. During 2005 and 2006 he gained experience as a manager on a *fazenda* in Querência with 7,500 ha of soybeans. However, he mentioned, "I was not allowed to leave to see my family during the week or even some weekends so I decided to take a break and find something else".[115] With Igor "I get to work longer hours but the [monetary] compensation is slightly higher" he mentioned. This is the second time he has worked for Igor: "the first time I worked with Igor I decided to take a break because of a *funcionario* [another worker]".[116] Niko mentioned that dealing with certain workers is what takes most of his energy. The existence of a farm manager is a response to the increase in scale of production. This exemplifies the dynamic in which a skilled worker can aspire to get better jobs and salaries, in which farm manager is considered a top position within a farm, but this may vary according to the arrangements of the owner of the farm.

The use of machinery, necessary for large scales of production, is another aspect that defines the specialisation within large-scale farms. On the one hand, machines require workers with the skills to operate them. On the other hand, they require specialised labour to repair them. In the case of the second it can be outsourced, but it can also be

[115] Interview with farm manager, 26th Feb,2010, Querência
[116] Ibid.

partly done on the farm. The decision becomes one of management. The Kurtis decided to employ a person who knows how to handle most of the repairs that might be needed during the *safra*. This is essential considering that his farm is 80 kilometres from the town. The role of the Kurtis´s mechanic was crucial both at the *safra* for any emergency repairs and between *safras* for the maintenance of machinery. However, other larger repairs were done in garages in Querência town. Having a mechanic differentiates the Kurtis's farming style in terms of the division of labour and degree of specialisation of their workers, but also the internalisation of an activity that facilitates having multiple machines.

The workers came from different states in Brazil, from the neighbouring Maranhão or Rondônia or the far northeast Sergipe. They were also of different ages, from a young 18 year old in search of working experience, to a middle-aged small-scale farmer with land in a LRS in Querência, to a 65-year-old man who was not easily hired given his alcoholism. Their diverse life histories speak of the migratory dynamics that soybean farms are generating. What is more, the lives of these workers speak of opportunities generated by employment in soybean farms to transit to family farming livelihoods. This is particularly relevant in Querência where a large percentage of plots in the LRS are abandoned or irregularly occupied, and workers from soybean farms are finding ways to obtain them (see Case Six). At least three of the workers hired by Carol and Igor had plots in a LRS in Querência, for example Niko the farm manager.

Niko has owned land in other states in Brazil, however he had to sell it and take his chances elsewhere. Before arriving in MT, he and his wife looked for a place to make their living in other states: in Goiás, Tocantins and Pará. But now they have lived in Querência for more than six years and they own two plots in *Pingo de Agua*, one of the LRS in the municipality. “Year by year [he said] we are doing something on the plots”.[117] In 2010 they had cattle on one of the plots and rented out the other one. They plan to move to the land reform settlement, but “we are waiting for better [economic] conditions” and have the plot ready to increase the chances of succeeding in that project, Niko stated.[118] Along with Niko, other workers on the Kurtis’s farm had or planned to have LRS plots, although not all had a livelihood strategy of settling as

[117] Ibid.
[118] Ibid.

family famers; an example was a rural worker who intended to build a house on the LRS for retirement. These dynamics contribute to a more complex understanding of the effects that soybean farms may be having in agricultural frontiers where there are LRS.

Carol and Igor's silo was brought from their previous farm in Goiás. The presence of this silo with its associated infrastructure reveals the scale of production the Kurtis are dealing with, and it also gives an industrial character to the farming style as it means processing the crop for storage. It is with this silo that "I can ensure a better profit", Igor said.[119] It gives them the flexibility to decide when to sell their harvest. However, as they do not have trucks to transport the crop they have to pay for the transport service offered by traders. Without the silo they would be limited to selling the production straight from the field, which could mean, Igor argues, "selling at a price that could make soybeans production unviable". In 2010 the Kurtis traded most of their harvest with the multinational Louis Drayfus which collected the crop directly from the silos in the *fazenda*. The silo gives them a different relationship with the market, and involves moving up the value chain to a more integrated vertical agribusiness farming model.

The silo allows the Kurtis to add value to their production. For example, the silo allows control of the degrees of humidity and impurities of the crop. These characteristics define the standards at which the soybeans are sold and if the sample of the harvest falls outside the defined range the traders discount a percentage of the registered weight. With a silo, the different soybean varieties are mixed so it is possible to control the homogeneity of it all, reducing the traders' discount for humidity. Furthermore, within the process of storage the grain passes through a process of *pre-limpieza* (pre-husking), where it is possible to reduce the degree of impurity of the harvest and the discount imposed by traders. The silo adds a level of industrialisation to the farm's production process that differentiates the style of farming. It facilitates the management of large volumes of production, reflects a capitalisation that farmers without silo do not have, and involves more labour force, among other aspects. The silo marks a more individualistic farming style. This contrasts with farmers at a smaller scale, such as the Oshembacks and Dureros cases, who find a similar strategy of adding value and gaining a negotiating advantage with traders by sharing a silo.

[119] Igor Op.Cit., 9th February,2010.

Another characteristic of Carol and Igor's farming style is an extensive network of relationships that involves the purchase of farming inputs outside the municipality. This aspect is considered a trait of large-scale soybean production and is associated with a farming style that brings less benefit to the local economy. This was mentioned by soybean producers in Querência in relation to the larger producers such as Grupo Maggi. Igor and Carol's farming style involves buying inputs from other region, partly because the volume permits negotiations to reduce the price of inputs, but also because they had a previous commercial relation with providers in Goiás. However, this does not imply that the Kurtis farming activity is fully disconnected from the local economy. There are various services they have to rely on, for example, food provision, accounting services, agronomic assistance, and georeferencing, or even purchase of machinery from local providers that offer good commercial deals, as was the case of the self-propelled sprayer bought from the John Deere representative. The Kurtis stand in between Grupo Maggi that provides almost all inputs for itself and farmers who access all inputs through providers in Querência.

Financial relations with international banks are another aspect that characterises Igor and Carol's extensive farming network. Their main financial source is the Dutch cooperative bank, Rabobank Group – one of the largest agricultural banks in the world, which in Brazil "only deals with large land owners who are doing transactions of more than 500,000 dollars"[120] – an example of how financial institutions stratify the farming styles, according to scale of operation. However, Igor and Carol diversify their financial sources and payment arrangements, for example purchasing fertilizers through a grain trading multinational and repaying with a percentage of the harvest. The purchase of machinery is with loans from multinational manufacturing corporations. The three newest harvesters and the last acquisition – the self-propelled sprayer – were acquired with loans from John Deere. As is the case with various large and medium land-holdings, Igor's farms could not be run without these loans. These financial relations indicate the large volume of monetary resources that are mobilized for large-scale soybean production, which involves a contractual relation between the producer and the financial institution, as well as the risk of insolvency.

[120] Interview with Daniela Mariuzzo, 27th July,2010, São Paulo.

Moreover, these financial relations put in the picture the process by which international banks have influenced farming practices under the narrative of sustainable production. Indeed Rabobank is an active institution in the multi-stakeholder environmental initiatives. It has its own agribusiness manual of good socio-environmental practices (Rabobank 2009), which has been a reference for the definition of the principles and criteria of responsible production of the RTRS.[121] The Kurtis relation with Rabobank has implied a pressure to comply with Brazilian legislation, particularly the preservation of APP, to stop any further deforestation, and improve of workers housing infrastructure in their farms.

Agrarian Dynamics

The Kurtis's livelihoods and farming styles present a story of migration to Querência of capitalised large-scale farmers, rather than small scale farmers as the Agribusiness narrative often portrayed. They are late migrants and arrived at a time when it was clearer to farmers that soybean was both a biologically and economically viable crop. The conditions for making its production the predominant farming activity were starting to be established. While other farmers were clearing forest close to Querência town, the Kurtis, along with other farmers, mainly large-scale farmers, ventured to deforest much larger areas than had been done previously, exclusively to plant soybean. By 2010 the economic viability of their enterprise was shaky, and the extensive area had required further investment in machinery, which meant accessing loans from an international bank and a machinery manufacturer. Intensification of production, with double cropping in the same year, seemed for them the strategic response to keep their ship afloat. However costs of production were multiple. The silo gave them advantages, but the long distances of dirt road created costs. The number of workers was equally a requirement of the scale but a cost to administer. When it was needed, they did not hesitate to pay overtime to keep the machines working 24 hours. Their arrival in Querência implied a transition to increased scale that after 10 years is still demanding changes in their farming practices.

[121] Interview with Landers, Op.Cit.

Besides soybean and pasture for cattle, Igor and Carol own a vast area of forest (23,400 ha). For the time being they are focusing their attention on production, but they are adopting the minimum environmental and labour legal requirements, including the preservation of the forest Legal Reserve stipulated in the Forest Code. The notion of malleable environmental legislation, and the uncertainty of a carbon credit market that would pay producers for standing forest, have contributed to the Kurtis' passive approach to integrating the management of forest with their farming activities. In relation to labour, the migration of rural workers and the changes to improve working conditions, including salary arrangements, are agrarian dynamics of importance. Of the multiple implications these two processes involve, the capitalisation of rural workers to invest in livelihood strategies to become self-employed farmers is exemplified by the livelihood strategy of Niko, the Kurtis´s farm manager. This is repeated with workers on the large scale farms of Antonio and Lumina Oshemback, and the medium-scale farm of Hector and Rocio Durero. It is also in the livelihood trajectory from rural workers to family farmers of the small-scale farmers Fernando and Camila Prestig, and Adão and Arlet Machado. All are presented below.

Case Three: Large-Scale Farmers II

Image 5.5 Harvest of soybean with forest reserve in the back, Querência

Antonio Oshemback (b.1964) and Lumina Oshemback (b.1973)

Antonio and Lumina arrived in Querência together in 1999. They moved from Rio Grande do Sul to the developing agricultural frontier of Mato Grosso knowing that they wanted to set up a soybean farm. With the help of their parents they bought two plots, a ten-hectare *chácara* where they live at the edge of the town, and a 3,000 ha *fazenda*, 12 km from the town. The size of their *chácara* allows them to have cows, an orchard and a vegetable garden which give them a high degree of self-sufficiency for most of the year, including the food for two permanent workers hired to produce soybeans. Their 3,000 ha *fazenda* is in Antonio's words a "*fazenda caprichada"* (well organised farm), with 1,300 ha of soybean plantations managed with large machinery, and worked with no-till agriculture, and all the APP and RL required by the Forest Code preserved (Figure 5.3).[122] In 2008 they bought a second farm, a 4,000 ha *fazenda*, located in the 90,000 ha former *fazenda* Maria Teresa, which was informally occupied and fragmented into *fazendas* and a settlement of small-holdings. In 2010, between their two *fazendas* Antonio and Lumina farmed a total of 1,400 ha of soybeans, but were planning in the coming years to expand this further into their newly bought pasture lands.

The Oshembacks represent farmers that have been able to accumulate further capital through soybean production and increase their scale of production by buying a farm within Querência. This differentiates them from the Kurtises, who arrived at a similar time but are still producing at the scale they embarked on at arrival. It also differentiates them from other soybean farmers, such as the Gracianos (see next case), who have less capital and have followed different farming practices, particularly in relation to diversification of production. Their life histories and farming styles are presented here in relation to this process of increasing their scale of soybean production. It shows the relevance of their livelihood strategies in shaping their faming style, as well as agrarian dynamics of farming differentiation that involve simultaneously retaining certain practices and changing others.

[122] Interview with Antonio, 18th February, 2010, Querência.

Figure 5.3: Map of the Oshenbacks' farm in Querência – Satellite image 2002

Source: Provided by farmer, satellite image from LANSAT5 (17-11-2002).

Life history

There are features that distinguish families who migrated to Querência which have an effect on their farming styles. One is the time at which they arrived, which defines the state of Querência's colonisation project and the conditions of agricultural frontier they encountered. Another aspect is the relationship they had with planting soybeans before migrating. Those families that arrived later, like Lumina and Antonio, found higher land prices, making settling more costly; but basic services such as water and electricity were in place, and health dangers such as malaria had diminished, reducing the risks involved in migrating to this agricultural frontier. As late migrants, Lumina and Antonio came to Querência when it was clear that the municipality had the biophysical characteristics and socio-political and socio-economic conditions for soybean production. This increased the security of their investment and reduced the risk of their settling.

Moreover, Antonio and Lumina had been soybean producers in the south. Antonio had been farming soybeans since 1992. He remembers, “soybean yields were around 32 to 35 sacks per hectare; now the average is 60 sacks per hectare […] in the south we did no-tillage for soybeans using wheat, here we use millet”.[123] When migrating to Querência they aimed to reproduce their lifestyle as soybean producers.“We arrived with plans to plant soybeans”.[124] They were following in the steps of other migrants from the south of Brazil, including two of Antonio's brothers, who were creating better conditions for soybean farming in Querência and other soybean production areas in MT. Having heard from brokers that land was for sale at a good price in Querência, Antonio’s brothers decided to try their luck with a larger property. They moved to what was advertised as promising land for large-scale commodity agriculture.

Compared to other farmers they arrived with considerable capital, both material and as farming knowledge, which has allowed them to construct their livelihoods as soybean farmers. Their previous experience with planting soybean meant that they had knowledge of agriculture when they arrived. Beginning with significant material and human capital enhanced their capacity to form part of the soybean production boom in Querência which started in the late 1990s. Moreover, their migratory trajectory and their relationship with soybean production reflect and shape characteristics of their farming style. They have built a farming style as capitalised farmers, and through soybean production they have accumulated more.

By 2010 the Oshembacks had bought another farm. Antonio considered that their only child, a 14 year old boy, would “have somewhere to come back to when he finishes technical school” and would manage the property.[125] The son was studying at the Instituto Federal Catarinense – Concordia (Federal Institute of Santa Catarina) to be an agriculture and livestock technician. It is a school of high prestige amongst the agricultural technical schools in the state that both Lumina and Antonio came from. Although the son could have studied in another school in Mato Grosso or elsewhere in Brazil, the decision to send their son there relates to their identification with the region and reinforces their family links to it. Antonio believed that his son would not need to

[123] One sack equals 60 kilos of grain.
[124] Antonio Op.Cit.
[125] Ibid.

study beyond technical school, and that "whatever he needs next he can learn on the new farm".[126]

Moreover, Lumina was passionate about the new land they acquired. The new farm was a cattle *fazenda* and Lumina was enthusiastic about returning to her family tradition of cattle breeding. She had projected a series of activities and improvements, including planting an orchard and improving pasture for cattle breeding, "it is my family's traditional activity".[127] However, Antonio recognised that he was not so familiar with cattle breeding, so they planned to start only with a few head of cattle, and soybeans would still be their main activity. According to him, their income at that time was almost one hundred percent from soybean, with the exception of Lumina's small sales of milk and eggs to the neighbours. This *fazenda* allowed them to own more farmland to secure their position as large soybean producers, and potentially involved them in implementing some sort of integration of soybean production, livestock, and forest conservation, following the iLPF promoted by Embrapa in Querência. In addition, it represents their livelihood strategy of generational reproduction involving their only child.

Farming Style

The case of Lumina and Antonio illustrates the blurring of classificatory boundaries between small-scale producers and large-scale producers. Moreover, their livelihood strategies exemplify a way of adapting to socio-political and economic pressures to become entrepreneurial farmers. Antonio considers himself a medium-scale producer. They do not have their own silo but just acquired (in 2010) a second harvester, a new green John Deere that "collects 55 sacks [3,300 kilos] of soybeans per minute, just about a hectare per minute," his worker said.[128] However, Antonio thinks that with the amount of soybeans they produce, on 1,400 ha, and the land they were adding with the new farm, they are moving towards becoming large-scale producers. This has brought other changes. One of these is a change in the administration of the farm, an activity he considers a burden. This change means for him that "they [media, banks and

[126] Ibid.
[127] Interview with Lumina, 19th February,2010, Querência.
[128] Interview with rural worker, Raphael, 18th February,2010, Querência.

government] want us to say that we are not farmers, but rural entrepreneurs", he adds, "I'm managing the *fazendas* as a company: the registration [of the farm] is like a company".[129] Their house has an office. Lumina, along with milking cows, tending the vegetable garden, making cheese and cooking, takes care of the accounting and other paperwork of the business.

In contrast to the image of an entrepreneur of a highly mechanised farm who spends most of the time managing the farm from the computer, the life of the Oshembacks appears closer to the stereotype of family farmers who have a diversified farm and produce their own food. As Antonio argued "we are a family working on our farm".[130] Indeed, the plot where Antonio and Lumina live could be the property of a small-scale subsistence farmer. The house is surrounded by an orchard and a flower garden. Most of it is pasture, used to graze a few cows which are milked every day by Lumina. At the end of the rectangular plot there is a river and they have the riparian forest corresponding to the APP required in the Forest Code (see Chapter Four). They have a parking space and next to it a maize plantation. Behind the house they have a vegetable garden that includes diverse vegetables such as cassava, pumpkin, carrots and even sugar cane and peanuts. However this food production is a minuscule part of their income. Antonio considers it a saving mechanism, as it "reduces the cost of food".[131] Lumina sees it as "my pocket money to buy things, and for the kid to learn about farming and not be out on the street".[132] The inclusion of this petty production as part of their farming style has been part of their livelihood strategy.

The way Antonio and Lumina produce soybeans is pretty much a conventional one in the region. However the details reveal the complexity of the production system and the multiple decisions involved. According to Antonio, on his first farm the planting procedures have been "more or less the same" for the past ten years.[133] They use no-till farming, which involves planting millet after soybean, "to have organic matter in the soil – green manure for the next soybean planting – and prevent soil run-off". Antonio points out that in contrast to the south of Brazil where "we used to plant wheat, in

[129] Antonio Op.Cit.
[130] Ibid.
[131] Ibid.
[132] Lumina Op.Cit.
[133] Antonio Op.Cit.

Querência we use millet for which I make only a small furrow".[134] The soybean seeds are treated with pesticides and fungicides as a preventive measure. As a general rule ten seeds are planted per metre, of which Antonio expects nine to grow, although this rate can vary according to the variety. The composition of fertilisers he uses is 00-20-20 for macronutrients (0% nitrogen, 20% phosphate, and 20% potassium), but "I also apply micronutrients, like cobalt, molybdenum, andiron", he mentioned.[135] Furthermore, the planter he uses can apply fertilisers at the same time as planting seeds. He uses a vacuum planter, so seeds are planted faster than with mechanical planters, he claimed. These practices have involved a constant learning process that implied relationships with other actors who provided information.

By 2010 Antonio and Lumina had been planting soybeans for around twenty years, of which ten in Querência. They participate in a network of people and rely on various sources for information about production and other issues around soybean. As many other producers in Querência, Antonio and Lumina consult two agronomists, Irio and Calmo, who have a technical assistance company based in the municipality. They have a long history and a good reputation for keeping track of the latest soil and plant management techniques, and technological advances for soybean production, for example working closely with Embrapa on the iLPF demonstration unit and providing the georeferencing and soil test services for precision agriculture. Antonio and Lumina also rely on the agronomists and technicians who work for the local companies that sell them agrochemical inputs, such as AgroSartory. All the agrochemical input companies in Querência, as well as in other soybean production municipalities, offer as a common service direct monitoring and personalised advice to the farmers as part of the inputs package. Antonio himself receives weekly visits during the farming season. This allows him to be aware of events in other farms within Querência or even neighbouring municipalities, as well as to discuss the decisions he has to take when it is time to apply *defensivos* (agrochemicals, literally defensives). Another space for obtaining and exchanging similar information, which is a widespread practice, is demonstration field days. Seed companies, in partnership with local companies and producers, set up experimental trials and then invite other producers to see the results of new and old seed varieties, as well as to share a traditional *churrasco* (barbecue). In sum, the

[134] Ibid.
[135] Ibid.

Oshembacks´ farming style involves a complex network of actors constantly sharing knowledge.

For Antonio it is the "volume of production [that] brings companies".[136] When Antonio arrived to Querência in 1999, "there were only two companies selling seeds; today there are more than ten", he remembers.[137] These offer technical advice and usually a package of inputs of the brand the local trader has contracts with, be this Bayer, Syngenta, BASF, Monsanto or others. Grain trade corporations followed a similar trend, from zero in 1999, when there were only three silos owned by people living in Querência, to having by 2009 the six main soybean traders present in Brazil (see Chapter Four).[138] A comparable story occurs with machinery companies, which have increased in number as well as the size of machinery they sell. This increase of commercial establishments related to soybean agri-food systems is perceived by various producers as an advantage. In Antonio's view, "the more companies, the more products the farmer can access".[139] In the case of soybean traders, producers are offered a broader array of arrangements, which include loans, *troca* (exchange of fertilisers for grain), future grain contracts, and others. For example, Antonio explained, "today some producers manage to pay in advance for their inputs and get 20 to 25 percent reduction in their inputs cost, whereas in the past they had to pay extra transport costs to bring it from other neighbouring municipalities".[140]

The Oshemback case, together with the Kurtises', exemplifies the expansion of capital intensive farming, linked to corporations. This implies a supply-demand dynamic, in which companies are attracted to new markets, and farmers demand their services as they increase their production. This results in a shift in agrarian structure and a particular form of differentiation of farming styles, markedly defined by farms becoming larger and farmers more capitalised. However, as in Antonio and Lumina´s case, their practices retain aspects of smaller scale family farming that are not completely overtaken by a capitalist drive. Their livelihood strategies involve continuity as well as change, creating a tension. Cultural, gender, and historical factors influence

[136] Ibid.
[137] Ibid.
[138] ADM, Bunge, Cargill, Louis Dreyfus, Multigreen, Grupo Maggie, and Caramurú.
[139] Antonio Op.Cit.
[140] Ibid.

the retention of certain ways of farming, while the advancement of corporations as part of frontier expansion result in the adoption of different practices.

In the year I met Antonio and Lumina (2010) they were still in a period of transition from having one farm to having two. Increasing their land involved investment risks and required a long-term strategy to administer the transition to a larger scale of production without losing the capital they had accumulated. Moreover, starting a second farm implied changes in their farming practices. By then, they had doubled their land and were gradually increasing the planted area, but they had increased neither the machinery nor the number of workers.The Oshembacks had on each of the farms a family that lived there as farm keepers. In addition they hired two workers for the production side. One, Raphael, had been working with them for seven years. He lived with his wife, two children and his father-in-law on their own 20 ha farm, just next to the Oshembacks' first farm. The other had worked with the Oshembacks for three years; he lived by himself in a rented room in Querência town. Both of these workers had *cartera assinada* (signed working papers) with the Rural Workers Union in Querência, a legal requirement for farmers and potentially a way for workers to protect their rights.

The increase in scale of production involved uncertainties about the benefits it would bring for the rural workers. They needed to adapt to new working conditions. Even having doubled the size of their properties, the Oshembacks had decided for the moment to stay with just two workers. Antonio participated directly in most farm duties all year round. During the *safra* their schedule was tight, from early morning to late afternoon. The increase in production was expected to translate into higher income, including for the workers. According to Raphael, Brazilian labour laws indicate that rural workers have to be paid a fixed amount established by contract. Nevertheless, Antonio, as an incentive for more efficient working, offered the workers an unregistered amount, paid in sacks of soybean, based on a fixed percentage of the harvest (1.5%). According to Raphael "it is almost not worth the effort; it will depend on the volume of the harvest: if it is big enough we get proper compensation at the end of it";[141] for him the working time and harshness of the job exceeded the actual expected compensation, so he was contemplating devoting all his time in the coming year to his own family

[141] Raphael Op.Cit.

farm. Moreover, as it was unregistered remuneration, in the long term, said the employee, "it is counterproductive as it does not get registered for our pension".[142]

These tensions in relation to labour illustrate an aspect by which farming styles can be differentiated. Rather than the management of contracts and jobs specialisation, as presented in the previous case of Igor and Carol Kurtis, in the case of the Oshembacks the changes in salary arrangements were geared to strengthening the profitability of the enterprise. Antonio and Lumina had faced the dilemmas of cutting labour benefits, delaying hiring extra workers, and stretching the capacity of their workers and machinery as a management strategy to reduce cost. Although this was done in a transitory period of expanding the scale of production, the process expresses tendencies of farming style differentiation in relation to labour management.

On the new farm the Oshembacks were using the conventional approach in MT to starting to plant soybean in fields that had either been recently deforested or degraded under cattle breeding. Usually the field is planted with rice for two years and then soybean in the third year. They had already done this on their first farm, back in 1999, and now they were doing the same on 150 ha of pasture and other recently opened areas of the new farm. The rice helps, Antonio said "to level the field before you start planting soybean, which is harvested at a lower level. Rice is harvested at 20 centimetres above the ground, soybeans at 3 to 5 centimetres".[143] Antonio's worker remarked, "before any planting you need to clear the area of branches and roots […] Even in the second year of rice you have to be regulating the height of the rotors of the harvester to avoid breaking the machine with left over roots".[144] In fact, in the areas where soybean was planted for the first time, Antonio's worker explained, "Antonio chose a seed variety that works well in new areas and is a taller plant, so the soybean can be harvested at a higher level. It is easier to harvest".[145] From this account it is possible to see the technical importance of rice as a crop within the system of soybean production.

Soybean producers in this region generally consider rice of secondary importance as it is used to start the soil in order to then plant soybeans. It is considered a transitory crop.

[142] Ibid.
[143] Antonio Op.Cit.
[144] Raphael Op.Cit.
[145] Ibid.

In this process rice occupies two years before what can then be 20 years or more of soybean production. This explains the presence of rice in the soybean agricultural frontier regions (Jepson 2006b). However this rice production in the cleared forest or pasture lands does not happen simultaneously, but at different times. In Querência rice was promoted and planted from the beginning of the colonisation project (see Chapter Four) and it is still planted.[146] This requires a network of actors that supply the inputs to farmers and trade the grain. The actors involved are not necessarily related to soybean production, for example traders and processors that deal solely with rice for the national market. Antonio recalls that "seven or eight years ago there was more rice. Now the silos are moving to soybean [but] the price of rice is higher this year".[147] In 2010 Antonio sold rice at R$52 per sack, while "the first three months after the harvest, soybean was just R$27, two to three Reals above the production cost, which averaged R$24".[148] As Antonio mentioned, there can be economic incentives to plant rice when the price of soybeans is low and the price of rice is high.

This all brings into question the pathways soybean producers can take in relation to the production of rice. Embrapa is promoting iLPF, with crop rotation of soybean, rice and pasture, as an intensified and sustainable production (see Chapter Four). Antonio is following the demonstration units that Embrapa has on a farm in Querência, and he is "thinking how we can use it for our farm",[149] but he is still not fully convinced of implementing the system in their farm. His doubts about making rice a key crop relate to its higher risk of harvest losses, and low prices, but also to the lack of integration of this crop within the soybean agri-food systems. The latter reflects the specialisation of corporations in soybean, and their narrow interest in just this crop. This has an effect on farming practices. For example, for farmers to adopt a system of crop rotation in large-scale production, they need to be assured of channels to trade the alternative crops.

[146] According to the Municipal Secretary of Agriculture rice importance in terms of area produced has decrease, however every year there are new plantations. From the statistics of the MSA rice production reduced from 20,995ha to 14,582 ha. In 2009/10, of the 202 soybean producers registered 70 produced rice, in 2010/11 it was 45 out of 204.
[147] At the beginning of the Querência colonisation project COOPERCANA was only trading rice, a factor that added to the reasons why the cooperative went bankrupt, as it did not support production of soybeans early enough (see Chapter Four). By 2010 there was one rice trader with silos in Querência, who had a rice processing industry further south in Agua Boa-MT; and there were other traders that came from other municipalities to buy rice directly from the producers.
[148] Antonio Op.Cit.
[149] Ibid.

Each year the Oshembacks use several varieties of soybean seeds. In 2010 they used six different varieties for 1,300 ha on their old farm. On the new farm they used the same seed variety for 90 ha, as well as one variety of rice for the 60 ha. They had used three of the varieties before, but they were planting the other four for the first time. He said he chose these from "what I saw in field trials and from what seed vendors were advising".[150] One of the main differences between these varieties was "their life cycle, going from 95 up to 120 days", Antonio explained.[151] This trait spaces out the harvest, instead of collecting all the soybean at the same time. Antonio pointed out, "with the amount of machinery I have it would be impossible to harvest it all at the same time".[152] Using various soybean seed varieties is common among soybean producers. Among other reasons, this is because it allows better management of large-scale production; it helps to reduce potential losses caused by natural adversity, such as epidemics, fungus or scarce rain; and is a way for producers to test new varieties promoted by seed companies. The use of multiple soybean seed varieties reflects that, although soybean is required to be a highly homogenous commodity, on the side of seeds there are both technical and biological reasons to maintain a degree of diversity, and the participation by producers to adapt seeds to the bio-physical characteristics of the region. This brings tensions as there are tendencies to monopolise the seed market, as the case of Roundup Ready (RR) Soybean seeds illustrates.

In the 2009\2010 farming season three of the four new varieties Antonio planted were GMO soybean seeds. He claimed to have used Roundup Ready-seeds in 2005 for the first time, according to him because "the transgenic is useful to reduce the presence of weed in areas where there is too much of it".[153] However, besides this benefit, the imposition of the use of RR by Monsanto has created tension with producers (see Chapter Four). Antonio mentioned, and various other producers confirmed, "up to last year conventional soybean seeds were more productive, with Roundup Ready soybean you harvest less", and he continued "the research into conventional seed was reduced [...] all the soybean will end up being transgenic".[154] What is more, according to

[150] Interview with Antonio, 20th February,2010, Querência
[151] Ibid.
[152] Ibid.
[153] Ibid.
[154] Ibid. In interviews with agronomist Caumo in Querência (9th May, 2010), representative of APROSOJA Nery Ribas in Cuiabá (29th June,2010), and producers in Querência, it was mentioned that in Querência transgenic seeds had not yet achieved the level of productivity of conventional seeds.

Antonio, the difference between transgenic and conventional soybean seeds is "the use of glyphosate", and although "it's the royalty on seeds that makes the cost of production of RR soybean higher […] now the price of glyphosate is higher and that of the other agrochemicals is decreasing [...] This is if you don't buy Chinese glyphosate, which is much cheaper".[155] Moreover, Antonio has not received any premium for conventional soybean. He said that "they are mixing it all […] they are not paying more for conventional".[156] On the contrary, in previous years when selling soybeans to the trading company Bunge he was charged royalties on conventional soybeans. After arguing and doing extra tests for genetic modification "the company gave up and paid him back".[157] For him, "no one has proved a negative effect from consuming RR-soybean: that is why there won't be a premium for conventional [soybean]".[158] The introduction of genetically modified RR-soybean seeds and the governance mechanisms created for their diffusion within the soybean agri-food systems, particularly by Monsanto, exemplify the less than simple relation of soybean producers with seed companies. Furthermore, this case reflects the difficulty of separating GM and non-GM. Although RR-soybean was not preferred by all soybean producers, the technology was introduced, creating a dominance of a particular technology shaping and constraining farmers´ choices.[159]

Agrarian dynamics

The second farm the Oshembacks bought is situated in what was the 90,000 ha *fazenda* Maria Teresa. It has gone through a process of division that involves large-scale farms and a settlement of small-scale farmers. Although the land titles for all of the occupants of the ex-*fazenda* are still disputed, Antonio and Lumina decided to take the risk and buy the plot. It was owned by a widow who did not live there and had for many years a family of workers keeping the property with a few head of cattle. Antonio believes that sooner or later the government will recognise their title to the property. This doubt contributed to the low price of the land. This story reveals the complexity of land

[155] Antonio Op.Cit., 20th February,2010.
[156] Ibid.
[157] Ibid.
[158] Ibid.
[159] These events in Querência, as well as in other municipalities, have led actors within the soybeans agri-food systems to promote initiatives that counterbalance the restrictive effects of seed monopolies. ABRANGE has launched with Embrapa the initiative "*Soja Libre*" which promotes nationally produced conventional seeds; and APROSOJA has pursued legal actions to regulate Monsanto's royalty charges (see Chapter Four).

conflicts in the region, and also a process of fragmentation of large holdings that started in the 1960s. Moreover, by the Oshembacks taking the property a change in land use started to take place, from degraded pasture to soybean production, involving their livelihood strategy of family reproduction.

As many other soybean producers in this municipality, Antonio has reacted against the national Forest Code and the Socio-Economic and Ecologic Zoning (ZSEE in Portuguese). Both these policies aim to regulate the use of land. A particular concern for soybean producers has been the restrictions on how much forest land owners clear in their properties, and how much do they have to reforest to comply with the laws. Antonio participated, together with other soybean farmers mobilised by the leadership of the Rural Union and APROSOJA, in the public meeting in Barra do Garças, which is in the south-east of Mato Grosso, 430 kilometres from Querência. In that public meeting Antonio recalled "as in previous year it was incentivised to deforest; we were advocating that what had already been done had to be considered; what was already opened [deforested] had to be considered a consolidated area [for agriculture]".[160] In that meeting two opposing proposals were discussed: a regulation to establish conservation areas versus recognition of the municipality as consolidated for soybean production. Moreover, soybean producers asserted that Querência had to be considered savannah *Cerrado* rather than tropical Amazon forest: "the Federal Government placed Querência as Amazon, while if it was considered *Cerrado* you could *desmatar* (deforest) more, up to 65%; that is what we wanted […] It is still in discussion".[161] This event reflects a capacity of a group of soybean producers to mobilise in defence of their interests, which are not necessarily those of corporations, but instead are related to their livelihoods. Nevertheless, their narrative is interrelated with the broader process in which their political representatives are constructing the broader narrative in defence of increasing soybean production, and in which corporate groups have an influence.

In sum, this case gives insights about livelihood strategies and a farming style deeply embedded in the process of expansion of soybean production. However it also shows that there are soybean farming styles that involve family networks, creation of ties to a particular place, reproduction of farming practices independent of soybean production,

[160] Antonio Op.Cit.
[161] Ibid.

and a complex network of socio-economic and political relationships, which differentiate them from corporate farming in the style of Maggi Group. The capacity of the Oshembacks to administer their capital and invest in further land are factors that create agrarian dynamics of farming differentiation and pressures to change practices. Antonio and Lumina´s further accumulation of capital and increase in scale differentiate their farming practices and the choices they are facing from those farmers of smaller scale, as the following cases show.

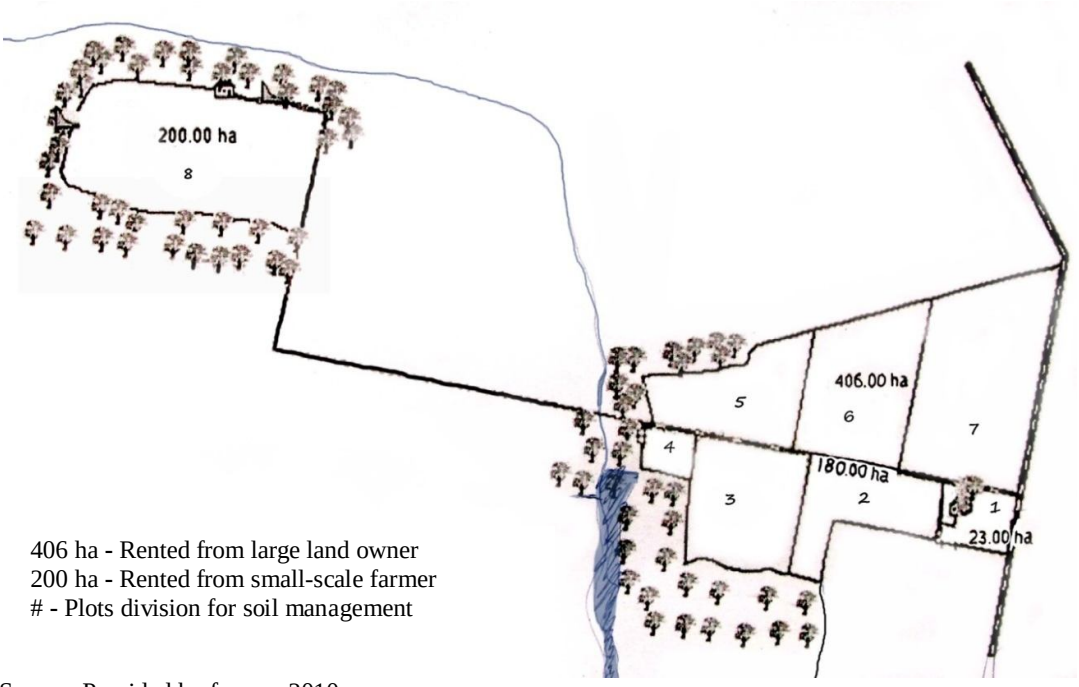
Case Four: Medium-Scale Farm I

Image 5.6 A sack of fertilizer at the Dureros' *fazenda*, Querência, 2010

Hector Durero (b.1964) and Rocio Durero (b.1968)

Hector and Rocio Durero were among the first people to come to the Querência colonisation project started by COOPERCANA in 1985 (see Chapter Four). They came in 1987 from Santa Catarina, south of Brazil, with one of Hector's brothers, Omar and his family, to work in 750 ha of land that their father had bought. Hector's and Omar's families lived on a shared farm for seven years. Afterwards, Hector, Rocio and their two children –aged 16 and 12 in 2010 – moved to the town, "mainly to be closer to the schools" Rocio commented.[162] Today, having split the property between families, Hector and Rocio's farm is 372 ha, where they still have the homestead of the *fazenda*. In addition, they rent a neighbouring plot of 400ha and another one of 200ha a few kilometres away (see Figure 5.3). By 2010 they had in the three properties a total of 820 ha of soybeans. Also on their own farm they had invested in eight hectares of *palmito popunha* (peach palm).

Figure 5.4: Dureros' farm map, 2010



406 ha - Rented from large land owner
200 ha - Rented from small-scale farmer
- Plots division for soil management

Source: Provided by farmer, 2010

Hector reveals himself as a farmer who keeps track of technological innovation. He does not adopt new technology for its novelty, but whatever he experiments with he adapts to the conditions of their farm. From the way technology has responded for him,

[162] Interview with Rocio Durero, 19th May,2010, Querência.

he believes that productivity can be maintained by good soil management and adopting new practices recommended by agronomists. He sees this in the fact that "I have productive areas with soybeans planted for 20 years".[163] Every year he receives a truck with sacks of tons of fertilisers, which are then spread by the harvesters in the fields according to the soil analysis. In addition he corrected the pH of the soil with limestone. He has an arrangement with a specialised local company to which he partially delegates the decisions of agrochemical applications. Moreover, he practices no-till agriculture, and is implementing precision agriculture.

Hector has also participated, with other soybean producers of Querência, in mobilisations promoted by the municipal Rural Union and APROSOJA to defend their interests. He was in the public hearing in Barra do Garaças-MT in April 2009 to debate the Socio-Economic and Ecologic Zoning – ZSEE (see Chapter Four). In line with what they defended then, Hector asserted during an interview at his farm that "this area [where he plants soybeans] is not the Amazon forest but a transition area".[164] This is particularly relevant when it comes to the debates around the Forest Code and the percentage of Legal Reserve (LR) that each property has to have according to the biome in which they are located. Hector is not comfortable with having to leave 80% of his property as a Legal Reserve if the property is considered to be in the Amazon Biome. He argues that they have followed the regulations that apply to their plot, as they have an official document giving them the right to farm in 65% of their property. He claims that with the recent changes in the Forest Code the legal status of their land is unclear and may imply that they have to reforest their property to have up to 80% of LR. As with Antonio Oshemback and Lorenzo Graciano (see next case), for him this is "nonsense",[165] partly because he believes that "soybean plantations capture as much or more carbon than old standing forest", and because "we can stop producing if they pay for the standing forest, but then there will be scarcity of food".[166] This all expresses his discomfort with the recent pressures created by environmental policy implementation as well as his position towards the changes that are being promoted. As the debates evolve he complies with specific socio-environmental regulation and adapts his practices. Nevertheless, he complains about the uncertainty of regulation and the difficulties posed

[163] Interview with Hector Durero, 20th, May,2010, Querência
[164] Ibid.
[165] Ibid.
[166] Ibid.

by these socio-environmental regulatory pressures, considering them a threat to the viability of his family agricultural enterprise.

Life history

The life history of Rocio and Hector resembles that of the so called pioneers that went from the southern states of Brazil to Mato Grosso in search of opportunities and access to land. Both Rocio and Hector were born in Santa Catarina, in southern Brazil. Their families' background is agricultural and the parents of both still live in rural areas. Hector's father, today retired, was a grocer but also had land where they planted soybean, wheat and maize with mechanised agriculture, which gave Hector and Rocio experience with mechanised agriculture before migrating. Concerned about not having enough land to distribute between all his progeny, Hector's father and an older brother went in the early 1980s to look for land in Mato Grosso. Later a land agent in Santa Catarina offered them land in what today is Querência. Knowing that "there were people from our region here", Hector said, "we were confident that the place could be good".[167] His father then bought land, where later Hector – one of the youngest sons – and one of his young brothers would live. For Hector this migration to the agricultural frontier in MT has reduced the land pressure in the southern states. "Before we talked about new areas we were crowded. Today those who stayed have more, also those who came have more".[168]

The history of Hector's family reflects the timber economic cycles that took place from the beginning of the colonisation project to 2000 (see Chapter Four). As Hector recalls, the "land was cheaper than the timber on it" and "planting soybeans was possible because of the [land] size".[169] Once Hector and his brother Omar were in Querência, another of their older brothers, knowing that timber was abundant in Querência, dismantled his sawmill in Santa Catarina and transported the machinery more than 1,500 km to install it at the new agricultural frontier. When the older brother arrived in 1989 there were already nine sawmills. The best period, Hector recalls, was "between

[167] Interview with Hector, 18th May, 2010
[168] One of Hector's brother stayed in Santa Catarina and owns six plots of 10 ha – 60 ha in total – in three different municipalities. According to Hector his brother is considered to operate financially as a *fazendero*, a large-scale farmer, in his region, while in Querência with more land Hector is a middle-scale farmer.
[169] Hector Op.Cit. 18th May,2010.

1993-1995 [when] land had no value. We would cut the timber and they would pay with land. The timber was more valuable than the plots".[170] However, Hector pointed out that as the accessibility and the volume of trees reduced, the timber economy started to lose dynamism. However, for him, what defined the closure of most sawmills, including his brother's one, was the actions the government took around 2000 to implement the environmental laws. Registration and compliance with a series of regulations were required to operate sawmills, but these were rarely fulfilled, so many sawmills were obliged to shut down (see Chapter Four). Hector recalls a drastic change in the municipality, "from having 15 informal loggers in 1999 to two officially registered sawmills in 2010".[171] It was in this period, the 1990s, that soybean plantations first occupied the cleared Amazon forest and C*errado* savannah, continuing until in 2000 soybean production became the predominant economic activity in the municipality.

During the first months of their arrival at the Querência colonisation project, in 1987, Hector and his family stayed in the area projected to be the village, which is today Querência town. Later they moved to their own farm, when their machinery was brought from Santa Catarina and they were able to clear the first 300ha of forest. They had already planned to plant soybeans. A year later they cleared another 200ha for soybeans. They started clearing forest close to the dirt road rather than near the stream, prioritising proximity to the town rather than access to water. In the first area cleared they established the homestead of the *fazenda,* where the two families lived for seven years. The soil was started off by planting rice and then after two years converted into soybeans plantations. According to Hector they only planted rice for two years as "by the third year it does not grow well".[172] Nevertheless "the areas were cleared from the beginning to plant soybeans", Hector recalled.[173]

When Hector and his family arrived in Querência, Mato Grosso was already a state where the production of soybeans was growing at an exponential rate. However, by 1988, when Hector started to clear land for soybeans, Querência did not even have a silo for this crop. COOPERCANA, the colonizing cooperative, had the only silo in the village and it was committed to trade only sacks of rice. Therefore the soybeans had to

[170] Ibid.
[171] Ibid.
[172] Hector Op.Cit. 20th May,2010.
[173] Ibid.

be sold in the neighbouring municipality, in the village of Canarana, 140 kilometres away – the closest point where there were soybean traders. In relation to the difficulties of transportation Hector responded that "the large scale allows it [soybean plantation], even when the income is low".[174] Hector and his family, as initial soybeans producers in a colonisation project, had to bear the difficulties of production and trade that have lessened with the later arrival of inputs and service providers and crop traders.

Moving their residence from the farm to Querência town contributed to changes in the Dureros´s livelihoods and farming style. Indeed, for the agribusiness narrative living in the town is used to portray soybeans producers as modern farmers (see Chapter Three). Living in Querência town had implications for their conditions of living as well as aspects of their farming style such as hiring labour. Their residence in the town is a one floor house surrounded by a garden with some fruit and coconut trees. They have bedrooms for each of their two children. Hector has a small office where he keeps technical books about soybean technology among other related documents and has a computer to do the paperwork as well as to access the internet to keep himself informed about soybean production and the grain commodities market. In the *sede* on the *fazenda*, where they used to live, they still produce most of the food they consume, from meat to dairy products and vegetables, which also feeds their workers who now live on the farm (more on labour below).

Farming Style

The Dureros´ farming style does not differ diametrically from that of the Oshembacks when it comes to their scale of soybean production (see Table 5.1).They also share a relatively similar migration trajectory involving the support of their extended families, and have a similar opinion of and response to the environmental policies. However the Dureros differ from the previous cases in their strategies of renting land to increase their scale of production and of planting *palmito* to diversify production and reduce the risks involved in producing only soybean on a not so large scale. Hector and Rocio´s farming practices bring them close to large-scale producers, or even corporate farming, in relation to their use of technology, nevertheless their socio-technological networks correspond to relationships that have been constructed for large and middle-scale

[174] Ibid.

farmer, but less for corporate farmers. While renting land moves them in the direction of increasing their scale of production, diversifying with *palmito popunha* relates them to a regional agroindustry where the providers are mainly middle and small-scale farmers.

Diversified farming was promoted early in the Querência colonisation project. COOPERCANA was promoting among producers the search for alternatives to soybeans and rice, such as the production of the spices *urucum* (annatto) and cinnamon, fruits, and other crops with the logic of diversifying the farming activities.[175]Hector recounts that "they incentivised the production of *urucum* but then did not ensure the market for it";[176] also, Rocio mentioned, in their farm"there are still cinnamon trees that they planted then".[177] However these never became economically viable crops. Also plantations of teak and rubber trees have been promoted as municipal projects. The Dureros have 100 ha of the first, but they are not planning to plant anymore. Following these past intentions to diversify the production in their property, three years ago they planted 8 ha of irrigated *palmito popunha*, a plantation promoted by the Municipal Secretary of Agriculture and a few *palmito* traders from neighbouring municipalities. For Hector the strategy of diversifying with *palmito* is intended to minimise the income volatility involved in relying only on soybean production. Nevertheless, the main crop in the *fazenda* is soybean.

The Dureros' property has a history of more than twenty years of 'management' changes around the production of soybean. In the first years of planting soybean the land was ploughed, as was the convention then. The area had contour management to limit soil erosion as the area has a 13 metre incline towards the stream. However in 1996 he became one of the first farmers in Querência to implement no-till farming. With conventional ploughing, Hector recounts, some of the area was starting to flood and degrade, "we started no-till agriculture to stop the running off of the soil".[178] At the beginning, he remembers, his fellow farmers were dubious of the system, and "they believed that the soil was going to get hard and that diseases would increase, but it was

[175] Interview with Alcides José Salamoni, 4thMay,2010, Agua Boa. Eichholz´s COOPERCANA newspaper archive.
[176] Hector Op.Cit.
[177] Rocio Op.Cit.
[178] Hector Op.Cit.

the opposite […]. My neighbours were saying, let Hector fail and then we decide".[179] Hector remembers that their machinery had required adaptation for no-till farming. It was later that they were able to buy the machinery designed specifically for no-till agriculture. Today no-till agriculture is the norm. There are differences in the implementation, but as Hector practises it, no-till consists of zero ploughing, and planting Millet after harvesting soybean. A second crop is planted after soybean to provide groundcover, to limit the growth of weeds, maintain soil humidity, and add organic matter to the soil. The soybeans are then planted through the cover crop, which, Hector confirms, is "*desecada*" (dried) with glyphosate or other agrochemicals before planting.[180]

Land management on Hector and Rocio's farm highlights the particulars of soil management, reflecting differentiated treatment of an area even under a monocrop system. The various plots that they plant with soybeans are managed differently one from the other. On the one hand, management differs because the plots have different soil conditions and histories of use. Moreover, they have taken on the areas they rent at different times so these areas are at different phases of use. For example, in the first areas where soybeans were planted, the soil was compacted so ploughing was used, a transgenic seed variety was preferred as better to handle weeds, and the agrochemical 2-4D was used to kill weeds. On the other hand, they differentiate the treatment by sub section of soybean areas as they are practicing precision agriculture in the established soybean fields. With private technical assistance they monitor these areas every year, so they have information about the soil content for every three hectares. This soil analysis allows them to learn about the distribution and application requirements of limestone, nitrogen, potassium, phosphorous and other components, for each section of their plots. In this way, precision agriculture brings the technical possibility to augment the harvest while maintaining detailed levels of land management. It is a practice that requires further investment, and small-scale soybean producers often cannot afford it, further differentiating farming styles.

In this process of managing areas differently, genetically modified soybean seeds have a particular use. Hector planted ten varieties of soybeans, of which 50% were

[179] Ibid.
[180] Ibid.

conventional and the rest transgenic. He used transgenic seeds in the areas where he and his technical advisors thought that weeds were going to cause losses. However, he considered, as most producers in Querência did, that "the yields of conventional seeds for this region have not yet been achieved with transgenic seeds".[181] Furthermore, as Igor Kurtis does, Hector plants early maturing soybean varieties to make room for maize as a second crop before the end of the rainy season. Although the Dureros have planted maize since they started farming that land, it had always been for household consumption. It was only in the last three years that Hector planted maize as a second crop after soybeans to sell as a commodity. In 2009 he planted maize as a second crop on 15% of his land and he expects to increase it to 30% in 2010.

Hector and Rocio have a particular arrangement for accessing agrochemicals and managing the application of fertilisers, with SinAgro, a regional agricultural inputs company that provides producers with a semi-outsourced service. The company has a commitment to provide at a pre-fixed price the quantities and types of agrochemicals the plantation will need in that particular farming year. This contrasts with other producers who buy a pre-defined quantity of agrochemicals before the planting season, which may lead them to have too much or not enough of certain products (as in Igor and Carol's case). SinAgro's service means they only purchase the quantities of products they actually use. During weekly visits to the plots, SinAgro provide technical advice and decide with Hector the right time to apply the agrochemicals. The farm workers then do this with machinery. In this sense, the company does not only sell agrochemicals but a service that involves, according to Hector, sharing the risks with the producer. "It is more expensive, but it is a fixed price, a percentage of the harvest" Hector explained.[182] In this way, he argued, the company also has a stake in the productivity.

Among other advantages that Hector sees is that he does not have to store the agrochemicals "which could be stolen", and is not responsible for disposing of the containers as state health and safety legislation requires. The company offers courses to their clients and their workers on handling agrochemicals as well as advice on how to clean and return the containers before taking them to the recycling centre on the outskirt

[181] Ibid.
[182] Ibid.

of Querência town. Furthermore, the company organises social events for the men, be this a night of football or a field experiment day, and also for the wives who gather for social activities. This all inclusive arrangement creates socio-economic and socio-technical relationships between input providers and soybean producers, which reflect a process of constructing and tightening the bonds of common interests. By participating in this network, the Dureros differ from Grupo Maggi and the Kurtises who have a more extended network of relationships with actors based outside the municipality, and differ from smaller farmers who do not have the economic capacity to buy the full service and therefore are excluded from this particular socio-technical network.

Not owning a silo, but having shares in the *Condominio*, is another attribute that situates Hector and Rocio, as well as the Oshembacks, in a different actor-network from that of corporate farmers or small-scale farmers. The majority of the Dureros' harvest is sold directly to Cargill. However Hector has been a member of the *Condominio* from the beginning, when mainly large-scale farmer got together to buy a silo (see Chapter Four). It has a storage capacity of 9,600 tonnes (160,000 sacks). The Dureros store 10 to 12 percent of their harvest there; around 70 percent goes to Cargill to pay for limestone and fertilisers and to sell through them "when the price is high", another part goes to SinAgro to pay for their services.[183] Hector believes that the members of the *Condominio* are recovering from investing in clearing forest and increasing their scale of production. The members were, in 2010, discussing a strategy to augment the storage capacities of the *Condominio* to adapt it to their increased production. This could involve requesting a loan from a government bank, but with 40 members it was not an easy discussion. Moreover, it would be a chance for these producers to add value to their production, but it required further coordination, and considering the negative reading of the history of cooperativism in the area, not many saw this as the safest thing to do.

The implementation of environmental measures and legislation has created, according to Hector, strong pressure to change practices, although he considered that these measures are not always reasonable and do not always achieve the desired effect. He is of the belief that "the less the government gets in the way, the better".[184] When Hector

[183] Ibid.
[184] Ibid.

was asked about his compliance with the National Forest Code, and the actions he and his family were taking in the farm to be credited with the Environmental Licensing of the state of Mato Grosso, two issues were raised. First, his discomfort with the pressure to adapt to changes in the legislation. According to him, recent reforms have retrospectively made him non compliant with the required area of Legal Reserve. The area the Dureros own has 36% of its original forest. When it was registered at the end of the 1980s they applied for the right to clear 65% of the property. However, Hector complained, nowadays “it is not clear if I have to leave 50% or 20%”.[185] There was a change in the legislation for the Amazon Region that does not respect the 20% of RL originally applied to their property. Since the Forest Code is in a process of reform, he is not clear whether he will have to reforest or compensate by buying forest elsewhere in order to comply. In the meantime, while the uncertainties of the national regulations settle, they are preserving the APPs but leaving the RL for later as the percentage is uncertain and he believes that preserving 80% will make his family's enterprise economically unviable.

A second issue was that they have acted in accordance with the consensus around preserving the pristine forest (see Chapter Four), “the APPs are to be left. It does not harm anyone" Hector stated.[186] "We made a dam and the criteria changed to 100 meters of preserved riparian area [rather than 10 meters for a stream]. I planned to have an orchard but I trespassed on an APP of the dam. Now I’ve left it to recover”.[187] Although not happy about having to abandon the 6ha orchard, he underlines that they are taking the necessary actions to respect the APP. These two issues raised by Hector reflect the approach to the implementation of environmental legislation and the way these policies are shaping particular practices on soybean farms. Moreover, the agreements and disagreements reflect the boundaries within which Hector and his family’s environmental practices are contested and negotiated.

Another issue that has been related to the sustainability of soybean production is that of working conditions. In Querência there have been cases associated with “slavery” (see Chapter Three). However, talking about slavery in the case of Hector, and most farmers

[185] Ibid.
[186] Ibid.
[187] Ibid.

in Querência, is out of place.[188] Instead, what this case tells us is about the changes in labour conditions, the drivers of these changes and the implications for farming. Debates about labour standards have a long history. In Hector's opinion, the "labour laws are from the time of Getulio Vargas, from 1936".[189] But the changes in labour conditions are defined by, among other things, the existence of a rural union with a strong commitment to protecting rural workers' rights (see Chapter Four). Hector compares the conditions in which the workers they hire live to how he and his family use to live on the same farm years ago. For example, housing conditions have improved, he implied, while pointing out that the rundown shack that was converted into a storage place was their old house. "Both my brother's family and mine were living in this shack; now you can't have workers in those conditions. Each of them has their own room".[190] The recent pressures to improve labour conditions carry material costs as well as requiring farmers to understand the regulations. Farmers, depending on their conditions, can find it more or less difficult to comply. For Hector, cost and being certain of compliance become additional elements to take into account in the administration of the farm. He is not fully comfortable to adjust to these but does so. This is yet another process in which there are forces creating farming differentiation.

Hector has four workers: three permanent ones that live in the *fazenda*, including the woman who cooks, and a temporal worker that comes every year for the soybean harvest months and goes to São Paulo for the orange harvest. They have all worked in the farm for eight years and all were born in Santa Catarina, South of Brazil. One of the permanent workers is the farm manager. He lives in a separate house with his wife, the cook. In parallel to working for Hector, over the past two years the farm manager has rented 150 ha of land to plant soybean with his own resources. The other workers live in a cottage with individual rooms and shared bathrooms. Attached there are a dining area and a kitchen. In recent years, as part of the requirements of labour regulations and the *licenciamento ambiental* (see Chapter Four), Hector has invested to improve the quality of the facilities within the farm's homestead. However, he considers this to be a way "the government obstructs […] it over-complicates. Imagine we can be fined because a

[188] The police went to the municipality and dealt with the Roncador case (see Chapter Four), but they also went to other farms. The presence of police in Hector's farm with no pre-announced reason is seen by him as aggression: "I'm not a criminal" he said.
[189] Hector Op.Cit.
[190] Ibid.

door is few centimetres narrower than what is officially required".[191] However, even though he complained and did not agree with the regulations, he was changing things to comply and stay out of trouble.

Agrarian dynamics

When Hector and his brother decided to split their plot into halves and "divide everything", Hector decided to sell some land he had near the town in order "to recapitalise.[192] The Dureros then rented two plots, increasing their area to more or less the same as they had when the two families were in one property. Hector and Rocio rented one plot from a large-scale farmer – who owned more than one property in Mato Grosso – and another one from a small-scale farmer – who rents the Dureros all his agricultural land but still lives in his farm house. Two aspects of this practice contribute to understanding agrarian dynamics in Querência. On the one hand, for Hector and Rocio renting was a strategy to increase their area of soybean and reach a higher scale of production, which made use of the machinery they owned and increased profit. It was a choice directly related to the need to make the enterprise economically viable. From Hector's narrative it seems that the option he had was to either leave agriculture completely or increase the area of production so that he could use the machinery he had. Hector talked about the process as a thoroughly discussed decision, implemented gradually. This farming strategy situates the Dureros' faming style as emergent middle-scale farmers. However, by 2010 they did not attempt to increase further their scale of production, according to Hector. They wanted to ensure an income from what they had that would allow them to pay for their children's university studies, as they showed no interest in farming.

On the other hand, the renting arrangements reflect different agrarian changes. The characteristics of soybean farming allowed the Dureros to trade soil improvement in exchange for land use, arrangements used when planting soybean on recently deforested areas and on degraded pasture. As Hector pointed out, "planting soybeans over degraded pasture will improve the soil conditions".[193] However the arrangements of the large-

[191] Ibid.
[192] Op.Cit.
[193] Ibid.

scale farmer and the small-scale farmer have different implications, both in terms of environmental practices and agrarian dynamics.

The larger plot Hector and Rocio rent, of 400 ha, is part of a larger property where forest had been cleared for cattle ranching but was never used for that purpose. By the time they rented it, in 2003, the forest cover had grown back. They started by clearing 200 ha of this young forest and after four years they cleared another 200ha. During these first seven years they have not paid rent, but instead "the clearing of roots and treatment of the soil is taken in exchange", Hector commented.[194] By the time they return the area, "the owner is expecting improvements in the soil, and he may continue planting soybean or put it to pasture for cattle".[195] The landowner was "a *pecuarista"*, a cattle breeder living in a neighbouring municipality.[196] His interest in renting the land had more to do with needing to have a productive activity on the land, so that the government would not claim the property as unproductive and therefore target it for land reform, or declare the forest area recuperated and therefore not deforestable anymore. Instead he was gaining time to decide what to do with the plot. This, according to Hector, could even involve selling him the area where he was planting soybean.

The other 200 ha plot the Dureros rented had been under pasture during the past 20 years or so. It is a sloping plot – steep for the generally flat topography of the area – that, according to Hector, had for several years "too many heads of cattle per hectare, with no system of rotation or any technique for regenerating pasture".[197] They had rented the area in 2009 to plant soybeans in exchange for improving the soil fertility over a six-year period. According to Hector, the owner had divorced so could not afford to invest in improving the soil. Cattle breeding had become an unviable enterprise for the owner. Whether or not the man would recuperate economically was uncertain, so there was a chance that Hector would buy the land in the future. Rent agreements like this are agreed for several years as it is "only in the third year that normal productivity can be achieved" without losses from degraded soil or prolific weeds, Hector

[194] Ibid.
[195] Ibid,
[196] Ibid.
[197] Ibid.

asserted.[198] For a soybean producer, renting land in this condition for less than four years, Hector continued, “would not be worth it, economically speaking”. This last statement contrasts with the practices of small-scale soybean producers (see case six).

Overall, this case represents middle-scale farming. However, the Dureros’ migration trajectory, the changes in their farming practices, their response to environmental legislation, and their actor-network of technology and knowledge provision, reflect their interlinkages with an emerging class of middle and large-scale soybean producers. Moreover, Hector and Rocio´s livelihoods and farming practices show a rather more complicated process in which their farming style is multi-directional: while they increased soybean area, they diversified with small-scale *palmito* production; and while they contributed to a process of land holding and deforestation, renting from a large land owner, they were improving the soil of degraded pasture on a small-scale farm. These are ongoing processes that entail unknowns in relation to which direction their farming style would develop.

[198] Ibid.

Case five: Medium-Scale Farmer II

Image 5.7 Road crossing LRS, unfarmed plots on the sides, Querência, 2010

Lorenzo Graciano (b.1964) and Monic Graciano (b.1972)

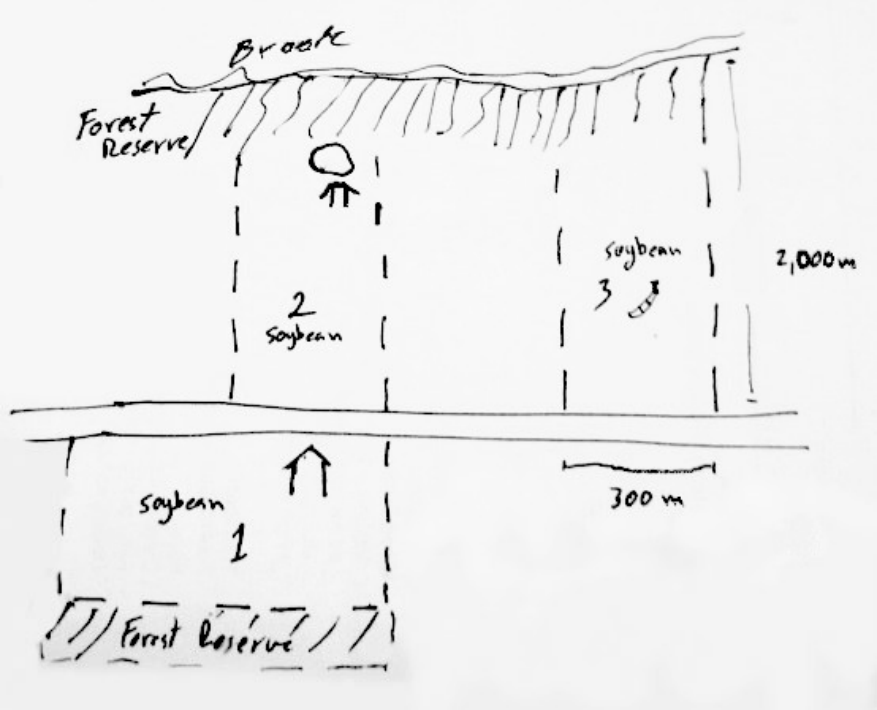
Monic and Lorenzo Graciano do not make their living just from agriculture. They both have jobs in the town. She is a teacher and he works in a government institution. However their family background is agricultural. Monic's family lived solely from farming until her father got involved in Querência's local politics and sold his farm. Lorenzo's parents are farmers in the south of Brazil and own 200 ha where they raise cattle and produce milk. When living with his parents Lorenzo worked in the fields for several years, but as "I [Lorenzo] had studied at an agricultural technical high school I was able to apply for a post as a civil servant in Querência", where he has worked since 1992.[199] In 2002, Lorenzo Graciano started farming again, and by 2009/2010 he was planting 160 ha of soybeans in three plots at a land reform settlement, Pingo de Agua (see Figure 5.4). The area is farmed with tractors and harvesters, with the usual package of high yield seeds, fertilisers and agrochemicals, and the soil is managed with no-till farming and precision agriculture. This defines Lorenzo as a capitalised farmer. He obtains soybean planting services from the same providers as other larger and middle-scale soybean producers in Querência. Moreover, most of Lorenzo's relationships in daily life are with farmers who have plots larger than his, including his brother who has more than 3,000 ha. However, unlike most soybeans farmers in Querência, Lorenzo participates in the Rural Workers Union, rather than the Rural Union, and accesses public credit directed to small-scale family farming.

Lorenzo is annoyed by the "environmentalist" pressure of recent years, and is sceptical of the need to do anything more than what has already been done in order to create a sustainable soybean agri-food system. Expressing his distrust of environmental NGOs he said, "environmentalists come here and want us to stop producing food. Then they go back home to Europe and eat their meat. Environmentalists don't know where their food comes from."[200] He continued, "they want to stop Brazil from producing, from becoming an agricultural power".[201] Moreover "the productive land should all be for production, preserving rivers and springs, and the unproductive areas – preserve them all."[202] For him, Querência was not the place to enforce the restrictive measure of 80%

[199] Interview with Lorenzo, 10th February, 2010, Querência.
[200] Interview with Lorenzo, 15th February, 2010, Querência.
[201] Ibid.
[202] Ibid.

Legal Reserve: he believed that for that they had "70% of *mata* [forest]" in the Amazon Biome, implying that Querência was *Cerrado* savannha.[203] Thus Lorenzo despised the environmental narratives and rejected the argument that soybean agriculture is having negative environmental and social effects. He believed that his use of technology – such as no-till and precision agriculture – was sufficient for sustainable production.

Figure 5.5: The Gracianos' plots in LRS, 2010



Source: Drawn by the farmer, Querência, 2010; words translated by the author.

Lorenzo is officially registered as a family farmer, as are all the cases of small-scale famers that follow. However, he uses legal loopholes to operate as a family farmer in a LRS. According to the selection criteria used for this thesis, the Gracianos are medium-scale farmers (≤ 1,000 & > 100), growing 160 ha of soybean. This is an area not much larger than that of the Prestig family, the next small-scale soybean farmer case selected here (with 90 ha of soybean). However, these two cases, although pertaining to the 'family farming' government classification, contrast in various aspects, such as livelihood trajectories, different levels of capitalisation, and differentiated socio-economic networks. Moreover, the case of the Gracianos differs from all other cases in having a rural livelihood which is not completely based on farming. Furthermore, this

[203] Ibid.

case is an example of the much criticised negative effects of soybean production in land reform settlements, as a crop that excludes small-scale farmers (see Chapter Three, agroecological narrative).

Life history

Lorenzo and Monic migrated at different times from the south of Brazil to Querência, where they met. Her family was among the first to move from Rio Grande do Sul (RS) to the colonisation project of Querência in 1986. Her parents were in their early 50s and brought her and two of her three siblings; the oldest sister stayed in RS. Monic did her primary and high school studies in the municipality, then started a maths university degree but interrupted it as "I was called to be a teacher at the public school in Querência".[204] She later became principal of a school in the municipality. Lorenzo left his parents' house in Santa Catarina (SC) at the age of fourteen to study in a boarding high school for agricultural technicians. After his studies he worked in various jobs in SC. In 1990, at 26 years of age, he visited his older brother who had already been living in Querência since 1986. He then decided to stay, as this was a place where "I could have a family and give them a good life".[205] They have two children, 13 and 15 years old, who live with them in a flat in Querência town.

In common with many other migrants from the south, Lorenzo has family ties in the rural areas and had been in contact with soybean farming since his childhood. This is relevant, as when he decided to engage again in agriculture he was already familiar with the crop, the production systems available, and the trading of soybean. He remembers that when he was a child his parents grew maize and soybean. "The maize was to feed the cattle, but not the soybean".[206] By 2010, he said, "my father has a small swine farm and my mother is a dairy farmer with 15 cows and 25 zebu cattle. They don't produce soybean anymore".[207] Moreover, his brother, who arrived in Querência in 1986 to work at a farm, has become the owner of a local trading company and a large-scale farmer: – in 2010 he planted 2,600 ha of soybean. Lorenzo had been in constant contact with soybean producers, so in 2002, he said,"I realised that I had some savings and could

[204] Interview with Monica, 13th Februrary, 2010, Querência.
[205] Lorenzo, 10th February, 2010, Op.Cit.
[206] Lorenzo, 15th February, 2010, Op.Cit.
[207] Ibid.

invest it in getting land to plant soybeans".[208] It was then that he arranged to have relatives apply for plots in a LRS for him to farm, and arranged with his brother to register a small area under his name so he could be a member of the Rural Worker Union and ask for public and private credit as a small-scale farmer.

Farming style: soybean production as a cash crop

Lorenzo argues that he is a small-scale farmer, which is coherent with his registration in the Rural Workers Union as a*gricultura familiar* (family farming). As a member of this union he participates in the general assemblies, and was registered as the union's deputy treasurer for two years. The three plots where he plants soybeans in the LRS are registered under the names of relatives. He claimed that 65% of the total area is planted with soybean – that is around 120 ha.[209] Lorenzo's membership of Rural Workers Union rather than of the Rural Union is justified by the area of production and, as he claims, that he doesn't "hire *permanent* workers", but only a temporary one.[210] However, as mentioned, what allows Lorenzo to be registered in the Rural Worker Union is not actually his condition as a soybean producer in the LRS. Instead he uses the papers from another property – a segment of his brother's farm – to register as small-scale farmer, i.e. what is locally known as *chacarero*, and not as a *assentado* (land reform settlers: see Chapter Four).

In contrast to a large majority of the *assentados* in Querência, Lorenzo can be considered a capitalised farmer. First, both Monic and he have permanent jobs that allow him to invest in agriculture. Second, he owns three tractors and equipment for planting. Third, in recent years he has been able to reduce the percentage of his harvest which is compromised to repay the inputs. By 2010 he was buying seeds and fertilisers in cash rather than grain, which reduced the cost so that he only had 10-15% of his harvest set aside to pay the local providers for the agrochemicals.

This degree of capitalisation has been possible, he mentions, because of a five-year bank loan from the *Banco do Brasil* (State National Bank), which is called a loan for

[208] Ibid.
[209] When interviewed he claimed to have planted 160 ha in the 2009/2010 harvest, and in the self-declared production data of Querência's municipal secretary of agriculture there are 260ha under his name.
[210] 15th,February,2010, Op.Cit.

custeio (production cost). He receives money to pay for the inputs and has to repay it every year to receive a loan for the next farming season. In addition, Lorenzo has accessed the PRONAF-*custeio*, which is a federal government loan exclusively for family farmers at subsidised rates, which he used to pay for the limestone soil correction. The loans are not registered for use in the LRS but on the other plot. This has allowed him to avoid the government environmental embargo on public funding for LRS in Querência, which is to enforce compliance with the *Licenciamiento Ambiental* (see Chapter Four). In contrast to the previous soybean farming cases, these are different relationships with financial institutions, mediated and regulated by the state. His category of family farmer and the regulations for LRS affect his access to resources, and shape his relationships with the unions and the state. These aspects affect the farming style, livelihoods, and agrarian dynamics.

The plots in Pingo de Agua where Lorenzo plants soybeans are 30 kilometres from the town of Querência. The three plots are rectangular, about 300 meters wide and 2,000 meters long – 60 ha each. This is a characteristic shape for plots in this LRS (see Figure 5.4). Two of the plots have a steep slope and a stream crosses the end of them. The riparian forest, or APP, has been left and marks the limits of the soybean plantations that cover the rest of the area. Both of these plots have neighbouring properties with pasture and sections of forest growing back. A family lives in one of these – according to Lorenzo, "a poor family that does little in their fields".[211] The other neigbour is not living there. The third plot used by Lorenzo is another 60 ha in a flatter area on the opposite side of the dirt road that connects all the plots.. The neighbouring plots also have soybean fields; these are owned by a family of six that migrated from RS to live in the land reform settlement and produce soybean as their main economic activity – 260 ha of soybean and 60 ha of rice in 2010 (a case that resembles that of the Prestig family, see next case).[212]

Lorenzo´s soybean plantations can be seen as an example of the displacement of small-scale farmers from the LRS. However, the process through which he was able to occupy

[211] Op.Cit.
[212] I had the chance to meet one of the young members of this family, who had migrated in 1999 to settle in Querência. I met him during a visit to an experimental field organized for soybean producers by AgroTerra – a local input provider – to promote 'high-yield soybeans seeds' from a Brazilian seed company, Sementes Adriana; events where is not common to find land reform settlers. The data of harvested area was provided by the Municipal Agriculture Secretary (2010).

the three plots – where other three families could be settled – was not defined by the presence of soybean *per se*. Between 1998 and 2002, that is from when the settlement was created until Lorenzo bought the plots, the areas had already been registered under the names of two different settlers. The reasons for the initial beneficiaries shifting ownership had no direct connection to the pressure to plant soybeans in the LRS, but were related to other factors that constrained these settlers from living in the LRS.[213] A frequently-heard story of how settler families had to leave their plots is that they were not able to capitalise on the timber resources they had in their plots. The illegal timber activity that boomed during the 1990s and early 2000s in Querência was a profit making activity that created pressure to sell timber cheaply. Timber was a main initial income for land reform settlers. However the conditions in which timber trade took place were usually unfavourable for the settlers. They paid high prices to clear the forest and received low prices for the timber. Once the timber resources were consumed, settlers who had not capitalised or succeeded in their livelihood strategies as settlers had to either work outside the LRS or sell their land. At that time the value of land was low, so even if it is not legal to sell plots in LRS, ownership was changing for a large majority of the plots. This process has allowed more capitalised farmers to enter, some of whom invested in soybean production, as is the case of the Gracianos.

The above is not generally considered in the narrative of many large and medium scale farmers in Querência around development in LRS. There is a common belief among these farmers, expressed in Lorenzo´s thinking, that "LRS fail because access to land is for free"; "they get it for free, don't value it, so then they go and sell it to go to the next reform settlement".[214] Moreover, Lorenzo argued that "in the settlements you can't find people who want to work […] the majority of the plots are abandoned, or with just a few head of cattle".[215] However, the absence of settlers in plots was corroborated by the president of the Rural Workers Union in Querência, by my visits to the LRS, and by a study by INCRA (Cardoso et al. 2005), these narratives, critical of LRS, express the socio-economic divisions between wealthy and poor farmers in the municipality. This adds a layer of differentiation of farming styles. It is within this narrative of failure of

[213] The difficulties to settle in these LRS, are often related by the own settlers to the failure by the government to implement the LRS projects, from giving the full offered initial resources, to create the infrastructure and provide the technical assistance, and so on. However various explanations have been advance to understand the success or failure on LRS (see Chapter Four).
[214] Op.Cit.
[215] Op.Cit.

the LRS that Lorenzo sees soybean farming as a way of making the plots productive and justifies his occupying three plots.

The relationship Monic and Lorenzo have with the land is shaped by the fact that they do not live in the LRS, and that they have no legal right to have plots in LRSs. What is more, their investment in soybean planting is for additional profit, rather than to make a living, as is the case with the previous larger scale farmers. In the land reform settlement plots Monic and Lorenzo have no housing, although in one of the plots, Lorenzo has created a pond for fish and next to it there is a shack where they keep a refrigerator for the family's days of leisure.[216] In another plot Lorenzo has a wooden shed and an open shack next to the dirt road. The shed is used to keep small equipment, barrels for diesel and a hammock in case the temporal worker stays over night. At one side there is a wood-fired stove for cooking. The open shack keeps a roof over the three tractors and bigger equipment. From the minimal constructions they have on the plots, it can be said that the Gracianos have a detached relation with the land, as it is used primarily as a means of production, and they value it as a resource for profit making. In contrast with settlers living on their farms, such as the small-scale cases presented below and the families living next to Lorenzo´s soybean plantations, Lorenzo´s management of the plot has no direct implications on his and his family´s living conditions.

The creation and quality of employment associated with soybean production is critical in understanding Lorenzo´s farming styles. This becomes even more relevant in relation to the implication of having soybean plantations in a LRS managed by a non-settler. Lorenzo hires one temporal rural worker, rather than the three families that the three plots could sustain as beneficiaries of agrarian reform (examples of this are Fernando and his family, whose case is presented below as small-scale soybean producers, or the family producing soybean on Lorenzo´s neighbouring plots). Moreover, the conditions of employment at Lorenzo´s farm reflect a neglect of the health and safety regulations: for example a hammock for temporary sleeping in the same space as the diesel barrels. These aspects of labour relation in the farming style practiced by Lorenzo are in conflict

[216] This shack is also to claim the occupancy and use of the plot to INCRA, otherwise this plot could be given to another family.

with the development aims in LRS of settling *agricultura familiar*. However, this is a trend that contrasts with other cases of soybean production by land reform settlers.

Moreover, the production of soybean in the LRSs has to be seen in the context of a larger picture in which soybean plantations are the main agricultural activity in the municipality, often framed as the only economically viable agricultural activity, or the most profitable (see Chapter Three). This implies that networks and considerable resources are geared towards the development of the soybean agri-food systems. It is in this context that Lorenzo and Monic have taken advantage of engaging in a profitable activity that complements their urban salaries. The Gracianos are able to appropriate land for soybean production because they have urban jobs and connections to access resources, as well as experience of planting soybean. This creates a particular agrarian dynamic of land dispossession whereby soy is only available to some. However, it is not only non-settlers that are planting soybeans in the LRS. There are also reform settlers that use soybeans as part of their farming activities (see the case of Fernando and family), also taking advantage of the opportunities. Moreover, instead of a predominance of soybean plantations displacing small-scale farming, the LRSs in Querência have become a mosaic of diverse land uses and farming styles (see Chapter Four). This situation is part of a process in which the role of soybean farming within the LRSs is contested.[217]

The agriculture that Lorenzo has invested in is mechanised. By 2010 he had acquired three tractors. He had equipment to spray agrochemicals and to distribute fertilisers. He used a 0-20-20 fertiliser composition, that is, zero nitrogen, 20 of potassium, and 20 of phosphorus. These three components come mixed and he applies them in the furrow at the same time as the seeds to have more effect. However he also has the equipment to apply the fertilisers across the entire field, a practice that is sometimes used when each fertiliser is bought separately. He said he manages the plantation closely and receives visits every fifteen days from an agricultural technician from the local company that sells him the agrochemicals; “they come even if you don’t call them, they want you to

[217] Counterfactual questions arise on what would be happening in the LRS in Querência if soybeans plantations were completely cancelled as an alternative for land reform settlers. Would other agricultural activities become more present? But then, why have alternatives to soy not happened in those plots that are currently out of use?

produce",[218] particularly when the inputs are paid for with a proportion of the crop.[219] He mentioned that it is with these technicians that he defines the application of inputs; however he also consults an agronomist in Querência town for soil management practices.

Lorenzo is aiming at having homogenous soybean fields. For this, he says, he is conducting precision agriculture. He has the analysis and maps of the soil for every three hectares. The plots were converted from forest and pasture to soybean plantations at different times and may have slight differences in the soil conditions. However, as a general rule in the first year he applied four tonnes of limestone per hectare. After two years he paid to spread limestone as recommended by a precision agriculture analysis of every three hectares. In this way he aims "to homogenise the characteristics of the soil".[220] However, he recognises that he does not have the machinery to distribute fertilisers according to the three-hectare precision agriculture and paying for the service would increase the production cost too much. Moreover, "the fertility of the soil is good, so there is no need for precision agriculture [with fertilisers]".[221]

In contrast to other soybean producers with a larger scale of production, Lorenzo did not use many seed varieties, only two. This was because on the one hand his farm "is a small area", so there is less space for many soybean seed varieties, and on the other hand, because "I planted only long cycle varieties. I don't plant early maturing varieties".[222] The latter are often used to plant maize as a second crop after soybean in the same year, which he did not do, or as a way to programme harvesting at different times. In the 2009/2010 agricultural year he used soybean varieties that mature in approximately 140 days. His selection of seeds, he mentioned, is according to "their adaptation to new land or to land that has been cultivated longer".[223] However the main factor he took into account is the expected productivity of the variety. It is for this reason, he said, that small-scale producers rarely use early maturing varieties as "these

[218] Op.Cit.
[219] It is in this way that local input providers also incorporate soybean trading as part of their income generating activities.
[220] Op.Cit.
[221] Ibid.
[222] Ibid.
[223] Ibid.

are less productive".[224] These practices reflect how the scale of production affects the way of farming.

Lorenzo does the usual rotation with millet for no-till farming that is used in the region. He plants millet as a second crop in the same year after harvesting soybean. For him this "breaks the cycle of soybean diseases".[225] Moreover, it does not greatly increase the cost of producing soybeans, as "you don't need any other product application", and you don't need to buy seeds every year, as the millet harvested serves as seeds for next year.[226] Lorenzo does not rotate with other crops because he does not see an economic incentive. In the case of rice, he has planted it in all areas for the first year to improve the soil and plant soybeans afterwards, but he does not consider it a crop that is "economically worth it".[227] In the case of maize he considers that "the price does not cover the costs".[228] In this sense, Lorenzo rules out for economic reasons a full year rotation with either rice or maize as an alternative for soil management in the production of soybean. However he is aware that market conditions could change and then planting another crop to allow the field a rest from soybeans could become economically viable.

The above shows how Lorenzo´s soybean farming practices do not differ radically from other middle and large-scale producers, as he uses technology similarly. However details indicate differences in practice that shape and are shaped by the scale of production and the degree of capital used. In contrast to Igor or Hector, Lorenzo is not intensifying production with maize, and is not using early seed varieties to space out harvesting, both techniques adopted for larger scales of production. Moreover, this case reflects how technology-led soybean production can be part of the livelihood strategy of a family with non-farming main activities. This condition, in conjunction with the scale, affected the relation with the land. The Gracianos had the LRS plots primarily to produce a cash crop, homogenous fields of soybean, and had secondary intentions to invest a lot in setting up a small-scale farm. This contrasts with the other cases, where the farmers were concerned with the farm as a whole, including the infrastructure, and not only the soybean fields.

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[224] Ibid.
[225] Ibid.
[226] Ibid.
[227] Ibid.
[228] Ibid.

Agrarian dynamics

By 2010 Lorenzo believed that there were no environmental problems with how he produced soybean. Moreover, he believed that "with this system you can produce for ages; in the USA they have done it for years".[229] He argued that the first area he cleared is the most productive, because it has a sandier, less clay-heavy soil, but also because he has added fertilisers and has nurtured the soil over more years. In addition, he considered that agrochemicals degrade rapidly as "the *defensivos* are phytosanitary so these are not harmful to the environment".[230] Finally, he made the case that "with no-till farming the soil does not erode".[231] Overall, he claimed that over time soybean production in his fields has improved the quality of the soil, rather than degraded it.

He believes that the people who see soybean expansion as an environmental problem lack understanding of what farming is. Indeed, for Lorenzo the publicised environmental implications of and restrictions on soybean production that are being debated are not based on scientific studies but are ideological stances that seek to limit the economy and production of food in Brazil: "they want to stop Brazil from becoming an agricultural power".[232] He argued that "people in the cities don't think about where the food comes from […] they want us to leave the forest standing but they want to continue eating high quality steaks".[233] Moreover, he considers that "not everyone wants to do the work of the producer; not even now that soybean and maize are mechanised and mean less hassle, less manual labour".[234]

Lorenzo also expressed criticism and discomfort in relation to the Forest Code. His view was that when people arrived here to colonise, the government encouraged people to clear the forest. The government slogan at the time, he recalled, was "*integrar para não entregar*" (integrate to not give away). But now, he said, "with this environmental issue, they don't want us to produce".[235] For him the Forest Code requirement to leave 80% of the property as Legal Reserve "makes agriculture unviable: it has to be reduced

[229] Ibid.
[230] Op.Cit.
[231] Ibid.
[232] Ibid.
[233] Ibid.
[234] Ibid.
[235] Ibid.

to make family farming viable".[236] He considered that "all productive land should be for production, respecting rivers and springs, but the unproductive should be one hundred percent preserved".[237] Moreover, he believed that "Brazil has a lot of preserved areas, 70 % of forest", and even "Querência has 40 % preserved with the Xingu Park", so the pressures to stop soybean expansion were not sustainable in reality.[238] He disagreed with environmental critics and was upset that "[soybean] producers are being pictured as the villain" of the story.[239]

The reality that Lorenzo voiced is the one advocated by APROSOJA, CNA, and ABIOVE as representatives of soybean agribusiness interests (see Chapter Three). This situates him socio-politically with the middle and large scale farmers. For him the environmental agenda was a direct constraint to his livelihood strategy. As a petty commodity producer, interested in accumulating, restrictions on land use were seen as undermining his potential. He was implementing soil management practices, so saw his farming as sustainable. In addition to the environmental pressures, the labour legislation also appeared as a constraint, and there were aspects with which he did not comply, such as registration of the hired labour in the rural union, and health and safety regulations. With the scale of production, the illegality within LRS, and level of capital Lorenzo had, the environmental and labour concerns were left, at least temporarily, to the side – something that larger famers with livelihoods wholly based in farming could not avoid (legally speaking), but also could afford.

In sum, the case of the Gracianos adds complexity to the differentiation of farming styles. In the context of Querência, in terms of volume of production they are small-scale producers. In terms of their relations with state institutions they are small-scale family farmers. However, the scale of production and the socio-technical network associates Lorenzo with some, but not all, farming practices corresponding to the middle and large-scale famers of Querência e.g. precision agriculture. Moreover Lorenzo´s critical posture towards environmental legislation corresponds, politically speaking, to the agribusiness narrative. His aspirations to be a soybean producer were facilitated by a set of institutional conditions – including the availability of LRS plots.

[236] Ibid.
[237] Ibid.
[238] Ibid.
[239] Ibid.

Nevertheless, if he was to follow the restrictions advocated by both the agroecological family farming narrative and the multi-stakeholder narrative (see Chapter Three) he would not be able to pursue his livelihood strategy. This situation is similar to that of the Prestig family to which we now turn.

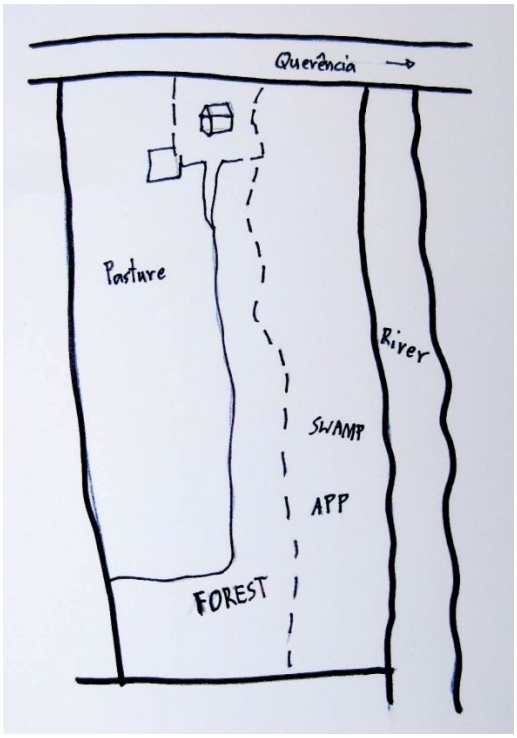
Case six: Small-Scale Farm I

Image 5.8 Ten year old tractor at the Prestigs' farm, LRS, Querência, 2010

Fernando Frank Prestig (b.1974), Camila Prestig (b.1975) and family

Fernando and Camila stopped working on an 18,000 ha soybean *fazenda* in 2005 to move to their 60 ha plot in a land reform settlement (LRS, Figure 5,5). Fernando's parents, Abelardo and Maria Prestig, and his younger brother and wife, Uber and Divina, were working in the same *fazenda* and also moved to the LRS. Another sister and brother obtained plots in the LRS but by 2010 they had not moved to live there. As a family they had five plots registered under their names (see Figure 5.6 and 5.7). The main activity on their plots, according to Uber, "is cattle breeding, [and] we all have productive fruit and vegetable gardens".[240] The parents take care of other livestock on their plot, including chickens, pigs, goats and dairy cows which feed all the family members. Aside from these activities on their respective plots, in 2010 Fernando and his family were planting 90 ha of soybeans on three other plots, and 56 ha of rice distributed on five other plots, which would be converted to soybean in the coming year or two. In total the family managed six full LRS plots – their own five and one they rented for cattle – and rented eight sections in other LRS plots.

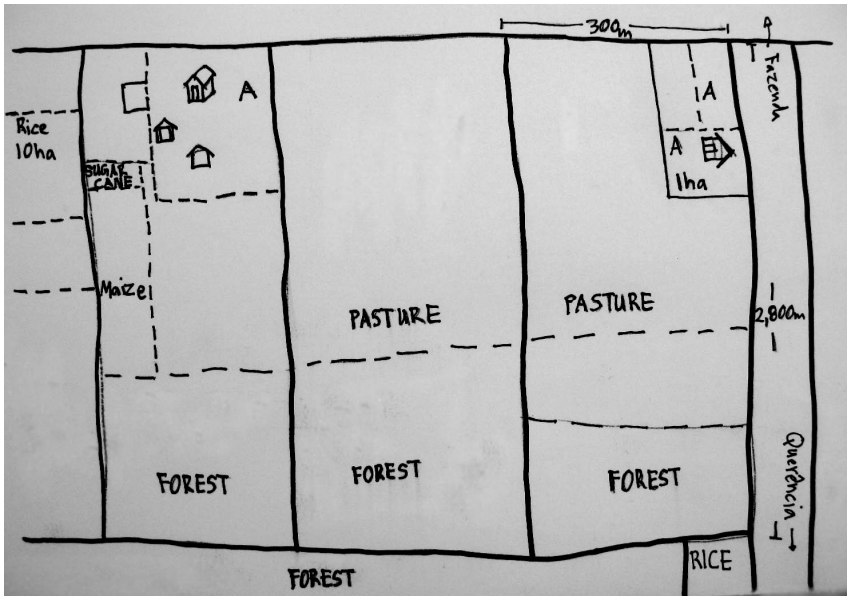
Figure 5.6: Fernando and Camila's LRS 60 ha farm, 2010



Source: Drawn by the farmer, 2010

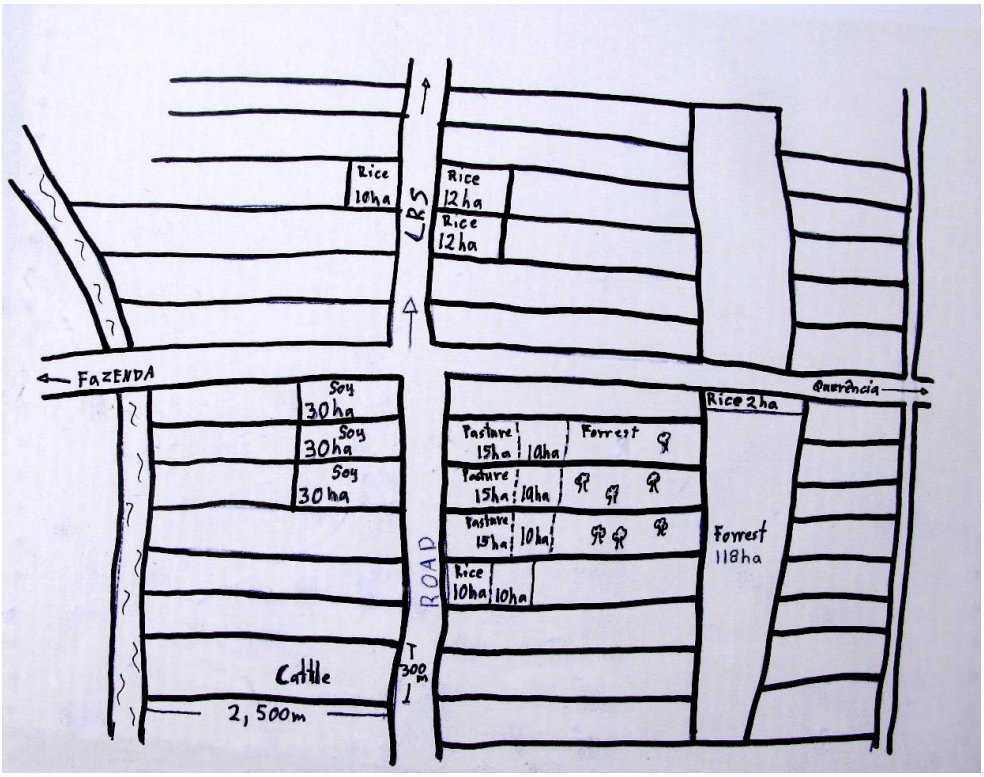
[240] Interview with Uber Prestig, 25th May, 2010, LRS, Querência.

Figure 5.7: The Prestigs' adjacent LRS plots, 2010



Source: Drawn by the farmer, 2010

Figure 5.8: Section of LRS with the Prestig' owned and rented plots, 2010



Source: Drawn by the farmer, 2010

Fernando was born in the state of Santa Catarina in 1974, from a peasant family of Italian descent. While he was working in the state of Goias he met and married Camila, who was born there in 1975. Both had studied until lower secondary. By 2010 they had three children, of whom the oldest was eight, the middle, five and the youngest, three. In 2001 they had bought their first plot in the LRS, less than two years after they had moved to Querência to work on the *fazenda*. In 2007 they exchanged the first plot for another 60 ha one within the same LRS, where they have lived since. According to Fernando it "has better soil and is next to the river, where I can go fishing".[241] This plot has two sides adjacent to swampy river banks, the third side borders the dirt road that leads to Querência town in one direction and to the LRS village in the other direction, and the fourth side borders another LRS plot. Since they arrived on this plot Camila has planted various fruit trees and other plants around the house "for shade and to have a natural barrier against the dust from the road" she explained.[242] From these trees and plants they harvest, for example, pineapple, *acerola*, *yabuticaba*, *graviola*, *cajú* and other fruit for their own consumption "almost all year" Fernando affirmed.[243]

Fernando and Camila's farming style is one of diversified production, sustained by strong family ties that make their farming enterprise a collective endeavour. Their life histories reflect a trajectory from rural workers to land reform settlers that is not acknowledged in the narratives of expansion of soybean production (see Chapter Three). Moreover, their farming case highlights how soybeans have a role in their livelihoods as small-scale farmers and in the LRS itself. In contrast with the Gracianos, they fit the criteria to be LRS beneficiaries. These makes Fernando and Camila's farming doubly controversial as it reflects that soybean production can increase in Querência via mechanised small-scale production, and it raises questions about the production option for small-scale producers within the LRSs in this municipality.

Life history

Fernando and Camila's history of migration from the south of Brazil to Querência is indicative of, first, the demand for workers on soybean plantations on an agricultural frontier, and second, of the migration of farm labourers seeking possibilities as small-

[241] Interview with Fernando Prestig, 26th May, 2010, LRS, Querência.
[242] Interview with Camila Prestig, 26th May, 2010, LRS, Querência
[243] Fernando Op. Cit.

scale farmers. Fernando left his parents' house in Santa Catarina to work on farms in other states when he was 16 years old. He recalls that during that time "I learned to work with machinery and plantations of soybean and other crops".[244] Later on it was his employment as a rural worker that led him and his wife to migrate to Querência. He was working for a soybean producer who owned farms in Goias and Querência. In 1999 Fernando was transferred for a few months to one of the two farms the *fazendeiro* owned in Querência to work as machine operator on a 14,000 ha farm. Once there he was invited to work as farm manager at the second property – a 18,000 ha area of forest in the north of Querência acquired in the late 1990s (a story of large land ownership that resembles that of the Kurtises).[245] This property was located next to the land reform settlement, where Fernando and his family later acquired land.

After a year of working on the *fazenda* Fernando invited his brother and his parents along. According to Abelardo (his father), "all our sons were moving: what were we going to do alone? It was better to come here [to Querência] and help".[246] In this sense Fernando and Camila's migration also led to the migration of some of his family with the intention of settling as farmers in Querência. Fernando and Camila worked on that *fazenda* for eight years and the rest of the family for six years before moving to the LRS. Fernando's aunt was married to the *fazenda* owner but they divorced, so "we decided to move to the plots in the LRS earlier than planned," Fernando explained.[247] Moreover, he mentioned that they maintain a good relationship with the *fazendeiro*. "He comes to his *fazenda* a few times a year and passes by to say hello", and also with the new farm manager and workers, as "we buy diesel from them at a convenient price in exchange for cattle and transporting machinery and grain for them in my brother's truck".[248]

During the years the Prestig family were working on the *fazenda* they saved money and planned their transition to the neighbouring LRS. They raised their own cattle on the

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[244] Ibid.
[245] According to Fernando, "he [the *fazenda* owner] planned to benefit from access to the road that crosses the LRS, as it is projected to be paved to connect to the BR-158 that gives access to the planned Rio Araguaia waterway and the railway up to the port of San Luis [north of Brazil]". This farm was at the very edge of the agricultural frontier in Querência, as when bought it was all forest and by 2010 it was still surrounded by large areas of forest.
[246] Interview with Abelardo and Maria Prestig, 1st June, 2010, LRS, Querência.
[247] Fernando Op.Cit.
[248] Ibid.

fazenda. "We wanted to move to our plots once we had enough cattle to make it [their transition to the LRS] economically more viable".[249] They were also saving money to invest in machinery. They acquired a second-hand tractor from the *fazendeiro* to add to the one they had brought from the south. Moreover, they started to apply limestone to the soil in the LRS plots that would later be planted with rice followed by soybean. However, as mentioned they had to move two years earlier than planned, so their start as independent farmers was not as capitalised and organised as they had envisioned. "The housing was not yet finished [...] the fields were not fully ready for high yield production [and] the pasture for the cattle was not ready", Fernando commented.[250] Nevertheless, by 2010 they had lived on their plots for three years and were managing the initial risk of settling. What this story tells us is that although the Prestigs were not as capitalised as they wanted, they were aware that to make a living on the LRS in Querência they had to accumulate a certain level of capital as well as to have land with improved conditions for production. This indicates the prerequisites for a small-scale soybean producer, but also a particular trajectory within the LRS that contrasts with most of the initial settlers, who arrived with barely any capital. This is an agrarian dynamic that creates social differentiation within the LRSs, as seen also in the cases of Lorenzo and Monic, and Elio and Rosa (presented below).

Fundamental steps in the process of settling in the LRS were to find, select and buy the plots on which they wanted to live, and to arrange the paperwork with a public officer of the National Agrarian Reform Institute (INCRA in Portuguese) to obtain legal permission to become land reform settlers and live and work on the plots. To acquire land in Querência there were three options: to afford to buy a large-holding, to buy a *chakara*, or to access a plot on a LRS. In this context, the informal selling and renting of LRS plots became crucial for Fernando and his family's livelihood strategy. According to the legislation, the land in LRS can only be legally sold by the beneficiaries, with permission from INCRA, either after ten years of possession, or when the settler becomes unable to make a living from the plot, for example on being widowed.[251] However, LRSs in Querência were created in the late 1990s and since then, as pointed out by Fernando's neighbour Inacio – one of the first people to arrive on the land reform

[249] Ibid.
[250] Ibid.
[251] Art. 171 of Criminal Code – Law 2848/40.

settlement – "many original settlers have left their land", creating flux in the land occupation process (see Chapter Four).[252] Indeed, Fernando and his family acquired plots in 2001, only a couple of years after the creation of the LRS in 1998. In 2010 the Prestig family had four adjacent plots and a fifth in another section of the LRS, where Camila and Fernando lived. The plots that they acquired, Fernando claimed, "were in various hands before ours".[253] Moreover, according to him the plot where he and Camila were living in 2010 was bought from "a widow who lived off cachaça [sugar cane spirit]", indicating that the land was not being worked and that the woman had to sell it because she did not have the wherewithal to make a living on it.[254]

Fernando's relationship with planting soybean reflects the relevance of accumulated knowledge and experience in the shaping of his farming styles, as a path-dependency process. According to Fernando, the experience he has gained from working in soybean farms allows him to feel confident that soybean is the crop that will give them a living. When asked why he was planting soybean he explained, "I'm doing what I like and what I know how to do […] I don't like working with cattle or vegetable gardens".[255] While Fernando had spent a large part of his life planting soybean and had a firm belief that they could live in the LRS as soybean producers, his father who had lived from poultry production had doubts that soybean was the best crop for them to plant as small-scale farmers in Querência.

Farming Style

The Prestig family's relationships with the actors of the soybean agri-food systems and their condition of *assentados* define how production of soybean shapes their farming style. Producing soybean as a commodity involves them with a set of actors and institutions not related to the creation of LRS. Moreover, their official category as family farmers and condition of soybean producers in a LRS situates the Prestig family in a position of double differentiation (as is the case of Lorenzo Graciano), both from the medium and large-scale soybean producers, and from the LR settlers that are not

[252] Interview with Inacio, 27th May, 2010, LRS, Querência. For him, the initial harsh conditions explain why many original beneficiaries left the LRS. These included illnesses like malaria, the long distance from town, no transport, few resources, no tools to work the land, no open area to farm, no electricity, no water, and so on.
[253] Fernando Op.Cit.
[254] Ibid.
[255] Ibid.

commodity producers. While they differ from large and medium-scale soybean producers, including Lorenzo, in having limited access to resources such as land, machinery, knowledge, and finance, they differ from some *assentados* in their higher capitalisation.

Fernando does not consider himself an *assentado*. In his view the fact that "I [he] paid for the land", rather than received it from the government for free, differentiates him from the category of *assentado*. Moreover, in his opinion "people from the land reform [in Querência] are persons that came from the city, who do not know about farming the land", with no 'farming aptitude'.[256] In Fernando's account of how land was transferred from the initial settlers – many of them from Goias – to newcomers, he says that "the *goiano* [from Goias] sold the plains that did not work; today the *bolsa* [receivers of social policy benefits] from the south [of Brazil] have taken over the fields".[257] Some of these first settlers had to sell their lands for various reasons: they were not able to live from the land, were living under precarious subsistence conditions, or working elsewhere, rather than making their land the base of their livelihood strategy (see Chapter Four). In this sense, Fernando situates his farming style within a group of farmers who bought land knowing how to farm and were successful in settling, in contrast with initial *assentados* who came from urban areas with little knowledge of farming and are not living from their plots.

Renting land from other settlers to produce soybean is an aspect that differentiates the farming style of the Prestig family from that of other *assentados*. By 2010 they had 90 ha of soybean and 56 ha of rice spread over eight plots that were leased. At least three of these LRS plots had no families living on them and had more than 50% of the area as forest. On these three plots the lease was in exchange for clearing the land of the trunks left from the initial clearing of forest, as well as preparing the soil for three years ready for planting pasture or another crop afterwards (similar to the Dureros' deal). According to Fernando this arrangement "is not a good deal; it should be for five years to make it profitable".[258] The 56 ha of rice were distributed over five plots, some of these with no families living on them, and all rented temporarily in exchange for preparing the land.

[256] Ibid.
[257] Ibid.
[258] Ibid.

In addition to the plots for soybean they were also renting an additional plot to breed cattle. Farming more land than just their own plots creates a socio-economic differentiation with *assentados* who do not rent extra land, and define the farming style of the Prestig family as expansionist. While renting land within the LRS was possible due to families failing to settle and to land speculation, the Prestig family's need to rent further land corresponded to the pursuit of economies of scale, a driving logic directly related to planting soybean as a commodity.

The presence of soybeans in LRS creates controversy among settlers as it is associated with land concentration and seen as counterproductive for development of family farming (as argued from an agroecological narrative perspective, see Chapter Three). Fernando mentioned that "there are those who say that settlements are not meant to have soybean, but I don't know if it is politics or what".[259] In agreement with Fernando, his brother Uber expressed that "soybeans bring progress [… I] don't know why the government is trying to stop it".[260] Fernando was not sure if there was a formal prohibition on producing soybean in the LRS; nevertheless despite this uncertainty he wanted to plant more.[261] This expresses the confrontation between two political/ideological notions of LRS development current in Brazil: one is the idea of progress through market based agriculture, such as with soybean, and the other development through family farming and land reform as an alternative peasant style. Yet the Prestigs reject this dichotomy, and have created a farming pathway that is not bounded by these framings.

However, their farming practices do come into contention with the land reform regulation of one plot per household. For Fernando "one has to find the point where the area is enough to make production of soybean worth it".[262] In his vision, in order to generate a good income "400 to 500 ha of soybean is a reasonable area".[263] Moreover, in 2011 Fernando was going to receive a 70 CV New Holland tractor under the *Mais Alimento* (More Food) government policy, which facilitates subsidised loans to family

[259] Ibid
[260] Op.Cit.
[261] There is no legal restriction on planting soybean in Querência's LRS, but policies geared towards LRS do not encourage it. On the contrary, within the narrative of the Ministry of Rural Development (MDA) soybean production is often framed as a crop for agribusiness as opposed to family farming (see chapter three).
[262] Op.Cit.
[263] Ibid.

famers through a public-private partnership (more below). According to Fernando, to pay back this loan "I'll have to produce 250 ha", a greater area than he was yet planting.[264] However, Fernando's father, Abelardo, mentioned, "I don't think that soybean is a good option; it is for the large [scale land owners], 2,000 hectares, 10,000 hectares. Maybe maize could be an option; but it is Fernando who decides on the soybean planting".[265] These quotes reflect that Fernando intended, and needed, to expand the soybean area, but also that they were aware of the pressure for large-scale production.

An aspect that differentiates the farming style of the Prestig family from the above cases of soybean farming, and within the LRS, is the ownership and use of machinery. They practice mechanised agriculture; however they do not have new tractors, harvesters or sprayers, as most medium and large-scale soybean producers have. Instead they own a 12-year-old refurbished tractor, a CBT tractor of similar age, an 8-year old planting machine and a 10-year-old harvester. The CBT tractor – a discontinued machine manufactured in Brazil "with high traction and pushing power" according to Uber – gives them the chance to remove fallen trees in order to set them in rows for planting in between.[266] They were able to buy the CBT tractor from the large-scale soybean producer they worked with before. In the last few years they have cleared the logs from both their properties and on other LRS plots where they have been hired for this service. Some of the forest area in the plots they live on was cleared with machinery, but a few years before 2010 "there were uncontrolled fires that started on neighbouring plots" Abelardo explained.[267] This burnt area amounted to more or less 20 ha; and in 2010 they were *ilerando* [clearing it of logs, setting them in lines] to convert it to agricultural land. Machinery allows the Prestig family to engage in a larger scale of production than other farmers in the LRS as well as to diversify their sources of income by offering their services for hire. However, the fact that their machinery is old has implications for the quality of their work as they have to devote a fair amount of time to keeping the tractors in shape. Alongside the knowledge that Fernando gained in his time on the farms he dedicated time to learn about mechanics, as he said "I like it".[268] When I visited his farm

[264] Ibid.
[265] Abelardo Op.Cit.
[266] Uber Op.Cit.
[267] Aberlardo Op.Cit.
[268] Fernando Op.Cit.

in 2010 he was dismantling a whole tractor to renovate it. This knowledge allows them to save resources and keep old tractors working, an aspect that defines small-scale soybean production and the farming style of the Prestig family.

In terms of the management of soybean production, Fernando and family follow more or less the conventional ways that the commodity is produced in Querência. It is Fernando who takes the decisions in his family about soybean production. Initially the areas were treated with powdered limestone – "otherwise you can't produce soybean", Fernando claimed.[269] This limestone is financed by *Novo Solo* – an input seller with an office in Querência – and is paid back with a proportion of the crop after harvest. The 90 ha of soybean they produced in 2010 were managed in the same way, particularly in terms of the application of agrochemicals. The areas are flat and generally level. As usual the areas were initially planted with rice for two years and then soybean. According to Fernando they plant with no-till agriculture, but he recognised that "there have been some complications [...] Not all the soybean area was planted with millet [to create the covertures for next planting season] and of the area that was planted only 30% sprouted".[270] To try to solve the problem "we will harvest millet seeds from the area that grew and replant them at the beginning of the next rainy season, just before planting soybean, so that we have the covering" Fernando explained.[271] In this sense, no-till farming is still not fully implemented in the Prestigs' soybean fields.

As for soybean seeds, until 2010 at least, Fernando had decided to plant conventional varieties, rather than transgenic. When asked why, he echoed many other soybean producers in the municipality: "I've not heard of any transgenic variety adapted to Querência's production conditions that reaches the productivity of the conventional seeds, so I've planted conventional".[272] In 2010 he used four varieties, each from a different production brand, although bought from the same provider – *Rural Querência*. The seeds were: 246 Codetec, from a cooperative from the south of Brazil; Monsoy 8866, one of the most common short-cycle soybean seeds used in the municipality, from the multinational Monsanto; 213 Yatai from Embrapa; and a fourth one, Emgopa 313 obtained from a public-private initiative in 1994 in Goias, which Fernando was testing

[269] Ibid.
[270] Ibid.
[271] Ibid.
[272] Ibid.

for the first time. This diversification of seed varieties allows Fernando to reduce risks and organise the harvest times. It also reflects the existence of multiple actors involved in the production of soybean seeds and the need for access to knowledge to make an informed choice on what varieties to use; for that Fernando relies on "my past experience in the *fazenda* and recommendations from *Rural Querência*".[273]

In the division of labour between the Prestig family, "Fernando is in charge of purchasing the agrochemicals as well as applying them" Abelardo said.[274] He buys the agrochemicals for both rice and soybean from the same input provider, *Rural Querência*. This company sells them a package that includes seeds, agrochemicals and technical assistance. When it comes to agrochemicals the provider offers a range of products; however these "come from the same manufacturer", declared the manager of *Rural Querência*.[275] The store has a contract that "gives us the exclusive right to sell their products in Querência, and we are loyal to the brand by not selling products from their competitors" the manager continued.[276] In this sense Fernando's choice of input provider implies accepting the brand this provider is affiliated to, so he gets the herbicide, pesticide, fungicide, seed treatment, and *secante* (dessicant product for weeds or the crop) from the same multinational company. Fernando also gets technical assistance from this store but "I don't often get visits", presumably because of the distance and the small scale of production.[277]

Fernando compared the production results in his and his family's fields with those of large-scale producers and neighbours, reflecting that he does not expect his productivity to differ from larger areas of production. In the initial years of land conversion, from cleared forest to rice and then soybean, the average yields were low, as expected. Only in the last three harvests, Fernando said, they had reached a point where the production of soybean was what they expected. In the 2008/2009 harvest they reached 54 sacks – 3.2 tons- of soybeans per ha, just below the 56.5 sacks average in the region.[278] However, for the 2010 harvest Fernando said "we got 43 sacks per ha, yet the

[273] Ibid.
[274] Abelardo Op.Cit.
[275] Interview with Bruno Telles, *Rural Querência* manager, 7th June, 2010, Querência.
[276] Ibid.
[277] Fernando Op.Cit.
[278] According to the Municipal Secretary of Agriculture statistics the 2007/08 average was 55; for 2008/09 it was 56.57.

neighbouring *fazenda* [where he had worked] got an average of 40 sacks per ha".[279] He reasons that his yield was lower than the average was because "we planted late" as well as because "we used less fertiliser per ha".[280] He had applied "270 kilos per hectare" in a 2-20-18 formula of nitrogen, phosphate and potassium, plus micronutrients. [281] In coming years he expects to increase to 450 kilos per ha, which, according to him, is a more usual quantity for soybean production in Querência. The use of smaller quantities of fertilisers can be considered a cost reduction strategy with implications for productivity, and therefore for the viability of planting soybean with reduced investment. In Fernando's own words "this year there was practically nothing left [no profit] after we paid the package, the lime stone […] something should have been left, but it did not happen".[282]

The distance from the town also implies that the cost of transportation increased for the Prestig family. Fernando is aware of the limits that they face by being a long way from the trading points and not having a silo. "By not having a dryer we are limited in the flexibility of times to harvest […] three crops: soybean, maize and pasture".[283] However, his brother bought a truck that can carry 300 sacks of 60 kilos each, so "instead of paying R$2 per sack for hired transport, we spend R$0.5 per sack on petrol" Fernando explained.[284] Moreover, the truck is part of the diversification of income sources, as Fernando's brother hires out his service to transport things to the town of Querência. Indeed, the ownership of a truck makes their farming style more economically viable.

Agrarian dynamics

As mentioned above, in 2010 Fernando expected to receive a new 70 CV New Holland tractor through the *Mais Alimentos* government policy that aims to make machinery more accessible through financial incentives for those fitting the official category of Family Farmers. The *Mais Alimentos* loan is to be repaid over ten years at low interest rates, with no payments for the first three years, interest free. To access this programme

[279] Fernando Op.Cit.
[280] Ibid.
[281] Ibid.
[282] Ibid.
[283] Ibid.
[284] Ibid.

Fernando had to go to the town of Querência for the documentation and to obtain the approval of the Rural Workers Union, the government bank *Banco do Brasil*, and any of the tractor companies registered in the programme, in his case New Holland. He believes that having new machinery is worthwhile as "tax payment is reduced with new machinery [and] there is less maintenance to do".[285] It is potentially the access to this tractor that will give him capacity to increase soybean production. Moreover, in spite of the list of requirements for obtaining the loan, Fernando points out, and it became publicly known, that "large-land owners were obtaining through *Mais Alimentos* tractors meant for *assentados* [land reform settlers]".[286] In terms of the farming style this policy relationship makes the Prestig family officially Family Farmers, while at the same time supports, through access to capital, the increase in the scale of production. The last may lead them to become middle-scale producers and differentiate further their position from less capitalised *assentados.*

Compared to other soybeans producers that live in the 'town of Querência', Fernando cannot easily access nor receive technical assistance, as it is more than 100 kilometres from the Prestig's farms to the 'town of Querência'. Moreover the type of relation he has with the input providers – shaped to an extent by the small scale of production, but also by the fact that the Prestig family are in a LRS – implies a differentiated treatment of less exchange of information with technicians from the input provider company. These input supplier companies are not so used to working with land reform settlers, so as Fernando recalls "at the beginning when we said we came from the land reform settlement they would not receive us. Later they started to welcome us. It helped that we had worked for a *fazendero*".[287] This reflects the agrarian dynamics at the level of relationships with input providers, in which there is a tendency to undervalue small-scale soybean production.

The socio-political networks of the Prestig family, particularly those of Fernando, are a mix of networks created in relation to the LRS and those around the production of soybean. However their farming is organised independently from other producers. They barely rely on any of the organisations of the LRS. In the past Fernando had got

[285] Ibid.
[286] Ibid. While in the Rural Workers Union office in Querência this was raised as a concern by the staff.
[287] Ibid.

involved in forming the Rural Workers Union based in Querência town and also in one of the associations in the LRS, but in recent years he had focused on their farms. As he mentioned "I'm interested in participating in local politics, but first I have to have a more stable farm".[288] He thinks that "things could improve for settlers with a cooperative", however he commented they have had difficulties organizing one.[289] Abelardo mentioned that "the selection of the members is the first obstacle".[290] He believed that they need an external person to define the selection criteria of members to avoid problems with the excluded people: "neighbourly relations have to be maintained in order to help each other".[291]

In sum, the Prestigs' socio-political networks reflect their interrelation with the LRS actors and institutions – shaped by a socio-economic differentiation among LR settlers – and a rather isolated farming style in terms of soybean production. It is in this sense that as soybean producers they face a differentiation from *assentados* but also from medium and large-scale producers. From the former they are separated in terms of their higher capital as well as their capacity to live from production in LRS plots. From the latter they are differentiated by their lower capital but also by not belonging to the socio-political networks in which the majority of soybean producers interact. This case reflects the complex agrarian dynamics of differentiation of farming styles. Furthermore, it is a farming style that falls outside the narrative dichotomy of large-scale agribusiness and small-scale family farmers.

[288] Ibid.
[289] Ibid.
[290] Abelardo Op.Cit.
[291] Ibid.

Case seven: Small-Scale Farmer II

Image 5.9 Cassava field, complement of soybean for the Machados, Querência, 2010

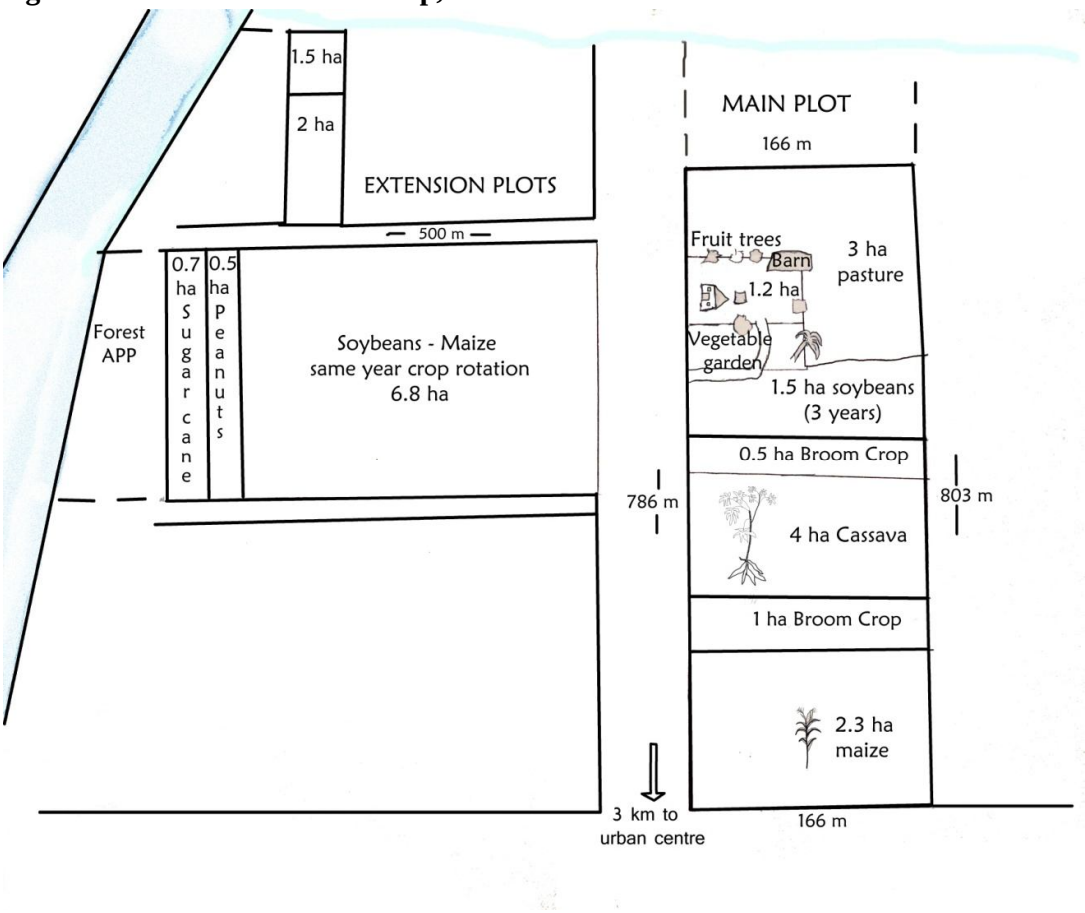
Adão Machado (b.1969) and Arlete Machado (b.1971)

Arlet and Adão Machado, 39 and 41 years old in 2010 respectively, started to live as family farmers in 2004 when they moved with their two daughters from a house in the town of Querência to a *chácara* [small farming plot] on the outskirts of the town to try a new livelihood strategy. He was a rural worker for a soybean *fazendero*, and she had various cleaning jobs, both in Querência.[292] However by 2010 they were fully committed to living off what they could produce, process and sell from their land. They started modestly by selling peeled cassava and today they sell cassava in almost all the supermarkets in the town of Querência, milk from door to door, and a diversity of products in the farmers' market on Sundays, such as salami, treacle, vegetables, pork meat, thick cream and brooms. Moreover they have integrated the production of soybean as part of their agricultural activities. In contrast to the Prestig family, Adâo and Arlet do not aim to make soybean the defining crop of their production, but rather a side income to complement their diversified production.

Their story of transition from workers to family farmers implied fundamental changes in their livelihood strategies, as well as in their farming practices and socio-economic relationships. In 2010 they owned three plots totalling 29.7 ha, and rented 4 ha (see Figure 5.8). One plot was a *chácara,* where they have lived since 2006. Here they had a diversified production: livestock, cassava, soybean, maize, an orchard, a vegetable garden, grass to make brooms, and more. On this plot they had also built two rooms to house a small agro-industry for meat and dairy products; they had a livestock shed, the equipment to make treacle, and their house with a pasture area, among other things. The second plot they owned was used exclusively to produce soybeans, approximately 9 ha. Their third plot was used for 6.8 ha of soybean and maize as a second crop, less than 1 ha of sugar cane, and 0.5 ha was planted with peanuts by the neighbour who in exchange lent them an extra 0.5 ha next to the 3.5 ha they rented from him. In this rented area they had agreed to plant soybeans for three years to improve the soil conditions so that the owner could plant peanuts or other crops afterwards. In total in 2010 Adâo and Arlet planted 27 ha of soybeans, an area that would decreaes during the next year as some of it had been replanted with cassava after the soybean harvest.

[292] In an interview Arlet mentioned that she had worked on different things before they moved to their farm, from cleaning houses to sewing clothes, but these were “only temporary jobs” (2nd May, 2010, Querência).

Figure 5.9: Machado´s Farm Map, 2010



Souce: Drawn by farmer and adapted by author, 2010

Adão grows soybeans without direct technical advice from either the local public or private extension services. Moreover, he and Arlet have integrated soybean production into their livelihood strategy in different ways. First, they bought land in exchange for soybean, using soybean as a currency. Second, they use soybean to regenerate degraded areas to then plant with either pasture or another crop, as they have done on their own land and in the area they are renting for three years in exchange for improving the soil. Third, they use soybean husk– the outer layer of the bean that comes off when the grain is dried for storage– to feed their cattle. Fourth, soybean is a crop that when sold at a good price, as Adão said, "can give us an income".[293] These multiple uses of soybeans were supported and made possible by a network of small-scale farmers who collaborate to improve the development pathways for small-scale farmers, as well as by Adão´s

[293] Interview with Adão, 29th April,2010, Querência.

previous relation with soybean production which allowed the integration of it in their transition to family farming.

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Life history

Both Arlet and Adão were born in Santa Rosa, Rio Grande do Sul, in the south of Brazil, but they met in Mato Grosso. They both finished their primary school grade in RS. Arlet moved with her family in 1989 directly from RS to Querência. They migrated looking for better opportunities of work and land access. She had relatives already living in Querência so "they [her parents] knew that they were coming to a village that was just starting, with few houses, and a dirt road […] electricity ran sporadically with a diesel generator, there were few commercial establishments, and no health services […]".[294] When Adão migrated to Mato Grosso, he first lived for two years in Canarana – Querência's neighbouring municipality to the south, with the urban centres 120 km apart. His brother was already working there. Adão worked in *fazendas* and also dealt with *ferro velho* (repairing old machinery). In 1990 he visited the village of Querência and decided to move there. By then the town's main employers were the illegal *serrerias* (sawmills), however Adão "[...] started to work on soybean farms".[295] He worked most of the time for the same family, alternating between the farms of two brothers, but he worked on the same *fazenda* during his last ten years before becoming an independent producer. In 2009 he stopped working elsewhere and fully joined his wife Arlet who had already decided to try her hand as a small-scale farmer in 2004. Seeing that with their jobs they did not have the quality of life they wanted, Arlet believed that "in a *chácara* we could live better, so we sold our house in the town in exchange for the plot and the rest was paid in sacks of soybean".[296] For the first few years she ran the processing and selling of the products from their *chácara*, with the help of the older daughter– aged 16 in 2010.

Although Adão's parents were soybean producers in Rio Grande do Sul, he felt that he did not learn about growing this crop until he started to work on other farms. In the 1970s his parents had 12 ha in Santa Rosa on which, he remembers, "they planted Santa Rosa soybeans" – the first soybean seed variety commercially distributed in Rio Grande

[294] Arlet, Op.Cit.
[295] Adão, Op.Cit.
[296] Arlet, Op.Cit.

do Sul.[297] What is more, they were given a prize for "[…] the highest yield in the municipality [and] they became seed producers for Pioneer".[298] Adão had nine siblings so he did not have much of a chance to work on his parents' property, and it was not until he went out to work that he started to get experience in agriculture. On the farms where he worked in Querência he was able to keep up with the technological changes that demand high skills from the workers. He mentioned that, to an extent, this had been possible "with training courses from companies […] I did one for harvester operators at the John Deere [corporation]".[299] On this farm he had various tasks, but he specialised as a driver of harvesters and sprayers. It can be said that Adão's relationship with soybeans as a rural worker has shaped the use of soybean in his and his family's passage to becoming small-scale farmers. Soybean production was key as a source of income to make the transition, but also the knowledge he acquired in the *fazendas* allowed him to manage the production.

Farming Style

Adão considers himself to be a "*pequeno produtor*" (small-scale farmer).[300] While he was a worker in the *fazendas* he heard about "family farming", but it was not until they started to live and work on their 13 ha plot that "I became more aware of what it is".[301] For him, "[…] soybean is not part of family farming. Family farming is to produce cassava, beans, breed a cow, and a pig […]," and "soybean requires large investment", he argued.[302] Moreover, contrary to what was expressed by all the soybean producers presented above, Adâo maintained that "soybean hinders the *pequeno produtor*".[303] "The *pequeno produtor* has to sell [their land] and the big one goes on buying it […] As things are today the big ones are receiving resources [from the government], not the small".[304] He also perceived the difficulties confronted by small-scale soybean producers in trading their product. He identified that there is a price difference that puts small scale production at a disadvantage as "producing a low volume, when there is a good price at the time of selling they will not call you, you have to look for them", in

[297] Santa Rosa is also the name of the Brazilian municipality where soybean was first planted as a commodity. It can be considered the area where the expansion of soybean production started in Brazil.
[298] Pioneer is an international and reputable seed brand among soybean producers in Brazil.
[299] Adão Op.Cit.
[300] Ibid.
[301] Ibid.
[302] Ibid.
[303] Ibid.
[304] Ibid.

contrast with producers with large volumes, who are informed daily about the market price.[305] However he recognises that soybean is good for soil correction. Adão had doubts about being able to live from the land they owned, but in 2010 they were fully engaged in this livelihood strategy. Whether soybean will remain part of their farming strategy is not guaranteed, but for the time being it has different purposes. As it will be seen below, the history of their access to land and their use of soybean captures the transition from living as rural worker and housewife to becoming family farmers.

In 2000, after Adão had worked for ten years on the soybean farms, they acquired their first piece of land, a 9 ha rectangular plot. This was a *chácara* on the outskirts of the town in a zone where in 2010 all plots were used for planting soybean as a monocrop, instead of food for the people in the town as initially planned in the Querência colonisation project (see Chapter Four). He in fact bought it to produce soybeans. Adão initially planted rice on this plot, as when he took it, it was "*chuquira*" (tall grass).[306] After one farming season of rice the soil was treated with limestone ready to plant soybeans. The plot was next to the soybean fields of the farm he worked at, so the 9 ha were planted together with his boss's land until 2009, when Adâo stopped working at that farm. The plot was managed identically: the same soybean seed varieties and agrochemical applications were used. In 2005 the plots were planted with maize as a second crop after soybean in the same year. "An Embrapa agronomist recommended we swap millet for maize as the field had acquired a millet disease. They suggested we let the land rest from millet".[307] During the agricultural season 2009/2010 he managed the plot by himself. Then he planted neither millet nor maize, but instead let the plot rest after harvesting the soybeans. In this season he hired the machinery services from another producer. Igor even planted transgenic RR-soybean, while his neighbours planted conventional seed varieties. He mentioned that "there was no problem" either during the application of glyphosate or when they sold their soybean as conventional.[308]

This 9 ha of soybean was an additional income to his salary as a rural worker. When Arlet and Adão decided to buy a plot where they could live and farm, this was paid partly with the soybean produced on this 9 ha. According to Adão when he first invested

[305] Ibid.
[306] Adão, op. cit.
[307] Interview with Adâo during visit to his plot, 30th April,2010, Querência
[308] Ibid.

in this plot, "It was just to sell the soybean; I was not thinking of moving there".[309] Like Adão there are other rural workers that venture to plant soybean to increase their income, but also to explore other opportunities. Some may try to increase their scale of production; others, as Adão and Arlet, have invested in a diversified farming style. In this sense Adão and Arlet's pathway is relevant to understanding the development synergies that exist between soybean production as a commodity and transitions to becoming family farmers. Soybean appears here as a source of accumulation that allows workers to move to being petty commodity producers. This becomes crucial in Querência considering that there are three land reform settlements where rural workers from soybean *fazendas* have plots.

In 2004 Arlet and Adão bought a second *chácara* of 13 ha, this time to live on it. It is three kilometres outside the town. It is in a different area from the first plot, a zone where other small-scale producers live. This *chácara* was left untouched for a few years after having been cleared of forest by the previous owner, who bought it in the late 80s. According to Adão they received it "abandoned".[310] This rectangular plot has a dirt road running along it and a brook that comes past the town and along the bottom edge of their *chácara* (see Figure 5.8). On the other side there is a *chácara* where the neighbour has a tree nursery. In the first year their whole agricultural area was treated with limestone. Then, after three years they applied limestone again in different doses per area according to how the land was used in the previous years. The plot has mainly *terra vermelha* (clayish soil), which is considered a good soil for planting soybean. By 2010 they were planting approximately 10 ha of this crop. However, they rotated the soybean fields with cassava cultivation or they planted either maize or broom fibre as a second crop after soybean in the same year. In addition, they use soybean as a crop to rotate not only in the same year – as medium and large-scale producers commonly do – but also for annual rotation. Furthermore, in the last year they converted a soybean area into pasture for cows.

The third plot they owned was 8.5 ha opposite the plot where they lived. They acquired it in 2006 and in 2010 they had to pay the last of three instalments agreed in sacks of soybean, 286 sacks of 60 kilos each per hectare. On this plot Adão plants soybean and

[309] Adâo, 29th April,2010, op. cit.
[310] Ibid.

sugar cane. The latter is to make various products that they then sell in the open fair every Sunday. Adjacent to this third plot they have planted soybeans on another 3.5 ha that they have rented for three years in exchange for allowing the owner to plant half a hectare of peanuts on their plot, while his land, degraded from many years of pasture, recovers with soybean plantings. Thus, through the use of soybean, small-scale farmers benefit mutually. In this sense the characteristics of soybean cultivation become tradeable, as the crop's ability to fix nitrogen, as well as the results of the use of fertilisers, improve soil conditions: a practice that contributes to the sustainability of agriculture of small-scale farmers in Querência through soil management practices.

In addition to soybean being a commodity for income and being used to manage soil fertility, Adão and Arlet use it in a third way, as animal feed. Adão mentioned that they "have noticed that giving the cows *silage* [a grain mix of maize and soybean husk] the milk production increases".[311]"We also feed the cows with cassava", with a similar effect on milk production.[312] Traders consider this husk waste from the pre-cleaning stage of soybean. Some years Adâo and Arlet acquired the husk for free from the *Condominio*. Other times they bought it from the multinational Cargill at ten Real cents per kilo. Moreover, their neighbours– small-scale family farmers– use the soybean husk to feed their livestock in a boiled grain mix version instead of the *silage*, and also as a mulch to retain moisture and add organic matter to the soil in their vegetable and *palmito* palm tree fields.[313]

This third use of soybean adds complexity to the ways soybean production can be part of the farming practices of family farmers. This case describes the possibility of having a positive effect from soybean production on farming styles that include the use of husk. Indeed, the use of this waste by-product of soybean trading has not formed part of the discussions of sustainable soybean production. Moreover, the use of soybean husk by Adão and Arlet, as well as their neighbours, is an environmental practice which involves a beneficial relationship between small-scale farmers and the production of soybean.

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[311] Ibid.
[312] Ibid.
[313] During the participant observation weeks with Arlet and Adâo I was able to visit and talk with the neighbours, a family highly involved in supporting the presence of family farming, particularly through the farmers' market.

In the process of becoming family farmers Arlet and Adão's relation with technology had a defining character. Besides the machinery for soybean, they had rustic equipment that allowed them to process products to sell. In 2007 Adão had bought a used tractor from a large-scale producer. However, for soybean production he said, "I hire the service from another person".[314] Also, on their 13 ha property they had their "mini agro-industry", as they liked to describe it.[315] This had two rooms, one equipped with the machinery to handle meat, the other to handle milk. They had a freezer to store the meat and an electric machine to mince it and make salami. To make fresh cream they had a hand-operated milk separator– an old metal device used on a weekly basis– inherited from Adão's great-grandmother and brought from RS, in southern Brazil. They also had old-fashioned equipment to make sugarcane by-products – a small refinery, lent by Arlet's father, which they use to make treacle over a bonfire. This list of relatively modest infrastructure and technology gives a picture of a diversified farming style and reflects the resources needed to support it. Moreover, this technology and knowing how to use it was fundamental to their becoming family farmers beyond a subsistence level.

Furthermore, the organisation of their labour was also an important aspect in their transition to small-scale farmers. Arlet commented that "we work much more now […] we have to decide how much work we do".[316] Being their own bosses, the success of their farm depends on how much work they put into it. Adão and Arlet's workload is more or less "constant" they said, however "we have times when we work more".[317] In September with the first rains, they start planting cassava. As the rain increases, by October or November they start planting soybean, which is harvested by March or April of the next year. June and July are the months to harvest any maize planted as a second crop after soybean in the same rainy season. The amount of soybean they plant on the plot where they live is dependent on the amount of cassava that they plant. They have perceived that cassava is an alternative source of income to soybean so "if we think we are going to sell more cassava we will then increase the area for it", proportionately reducing the area for soybeans, Adão indicated.[318] The amount of fibre planted for broom making is undefined, as it is a recent venture they have agreed to undertake with

[314] Ibid.
[315] Ibid.
[316] Arlet, Op. Cit.
[317] Ibid.
[318] Adâo, Op. Cit.

Arlet's father, who has the know-how of broom making. In the case of livestock they have work all year round, as they sell milk, butter and cream on a weekly basis, and for the farmers' market on Sundays they also produce salami and slaughter a small pig every week. Adâo pondered "today we invest a lot, so what is left is not much, but we have a better income […] we don't have fixed working hours or a salary [but]we do not regret having made the choice of living from what we can produce".[319]

Agrarian dynamics

The case of the Machados contributes to understanding the emic differentiation of farming styles in Querência. As owners of *chácaras* they belong to a different category to the owner of the *fazenda*, but also to the *assentado*. The history of land use of two of the Machados' plots reflects the differentiation between the *chacareros* and *fazendeiros,* and their decision to buy *chácaras* and not move to a LRS reflect notions of differentiation between these two categories of small-scale farmer. The *chácaras* were originally intended by COOPERCANA to be for food production for the town (see Chapter Four), but Arlet and Adào's plots reflect two distinct pathways of land use. The plot where they had only soybean – the first one they acquired – is around ten kilometres from Querência town in an area originally planned for *chácaras.* However several of these plots were bought at the beginning of the colonisation project by a few families that got adjacent plots in order to have bigger contiguous areas near the village, and make them into *fazendas*. By 2010 many of these plots were owned and planted by the original buyers and the landscape in this area was dominated by soybean fields owned by *fazendeiros* with their respective forest legal reserves. Adão's plot had the forest reserve of the neighbours on two sides of the plot, and on the other two sides there were soybean fields. In the other areas (see Figure 5.8), where Arlet and Adão have the other two plots and their house, soybean fields do not dominate the landscape. There, all of Adão and Arlet's neighbours are small-scale farmers. This area became a cluster of *chacareros* that have common interests and cooperate to advocate their common good, such as promoting a farmers' market. These differences in land use are part of the competing dynamics between the soybean *fazenda* owners and the small-scale *chacareros.* However, the Machados participate in both processes.

[319] Conversation with Adâo and Arlet, 1st May,2010, Querência.

Adâo and Arlet, in contrast with the Prestig family, moved to a *chácara* rather than to a LRS plot. Arlet said that "the LRSs are too far from the town and they don't have good schools".[320] Also, Adão decided not to deal with the bureaucratic procedures and legal uncertainties that exist around acquiring land from the government. Furthermore, he believed that there is an important difference between the LRS and the *chácaras*. For him "the land reform settlement depends on government resources, instead of having to work to pay for the land […] there are times when the government money is not applied".[321] For him in a *chácara* there is no way to live if you don't work, while in a LRS, in his view, people receive government resources so they don't have to work hard to get what they need. However he considers that with these LRS "the majority of the people [from the settlements] are not walking around hungry in the village".[322] This negative opinion of the *assentados*, leaving aside its contested truth, reflects the view of many medium and large-scale soybean producers, and indicates a socio-political differentiation between farmers in Querência that affects livelihoods and farming styles.

In Querência there is a socio-political tension between *chacareros* and a sector of the local political elite, mainly soybean producers, who have no interest in strengthening the viability of small-scale farming livelihoods. This tension is most shown in the struggle by *chacareros* and *assentados* – gathered under the Rural Workers Union – to find spaces and ways to sell their products. In 2010 one of the conflicts was the delay of many years in constructing a building for the farmers' market, when federal money was already approved.[323] According to a *chacarero* it was because "the mayor, a large soybean producer himself, is only interested in supporting soybean producers".[324] Although Adão and Arlet were not very active politically, their farming practices were directly related to these agrarian dynamics.

Moreover, this case reflects that in Querência the actual creation of spaces to sell products from small scale producers is not in direct conflict with soybean production, but rather it is potentially an opportunity if the emerging middle classes of soybean producers increase the demand for farmers' products. The conflict is more often a socio-

[320] Arlet, Op. Cit.
[321] Adâo, Op. Cit.
[322] Ibid.
[323] Interview with Genesio Falabretti, president of the association of *chacareros*, 20th,May,2010, Querência.
[324] Ibid.

political dynamic entrenched in a broader historical process in the country rather than a real incompatibility of farming styles. The Machados started selling small quantities of cassava door to door in Querência town, but as they found more places to sell, such as supermarkets, they have gradually augmented their cassava production. They also started selling milk door to door. Later they were invited to participate in the farmers' open market, where around ten family farmers sell their products every Sunday. Adão and Arlet were uncertain what they could sell at the market so "we started timidly with cassava, but quickly we realised that it was a fun activity and we are now selling around eight products".[325] According to Adâo, since they moved to their *chácara* in 2004, every year they have increased their production.

In sum, the Machados, as well as the Prestigs, exemplify a trajectory from rural workers to soybean producers, which is absent from all narratives of soybean expansion (see Chapter Three). In the case of Querência this becomes crucial as the small-scale farmers are an emerging class (see next case, the Randiok family). Moreover, the farming scale of Adâo and Arlet, involving 27 ha of soybean, has led them to explore farming practices that none of the other cases of famers with larger scales of production have, e.g. rotation with cassava. Their relationship with different farming styles simultaneously, that is planting soybean as a monocrop cash-crop for export and having a diversified production to sell in the local market, gives insights on the process of transition from rural workers to family farmers, and how small-scale soybean production has a role beyond connecting Adão and Arlet to the soybean agri-food systems.

[325] Interview with Adâo during the Sunday farmers market,2nd May,2010, Querência.

Case eight: Small-Scale Farmer III

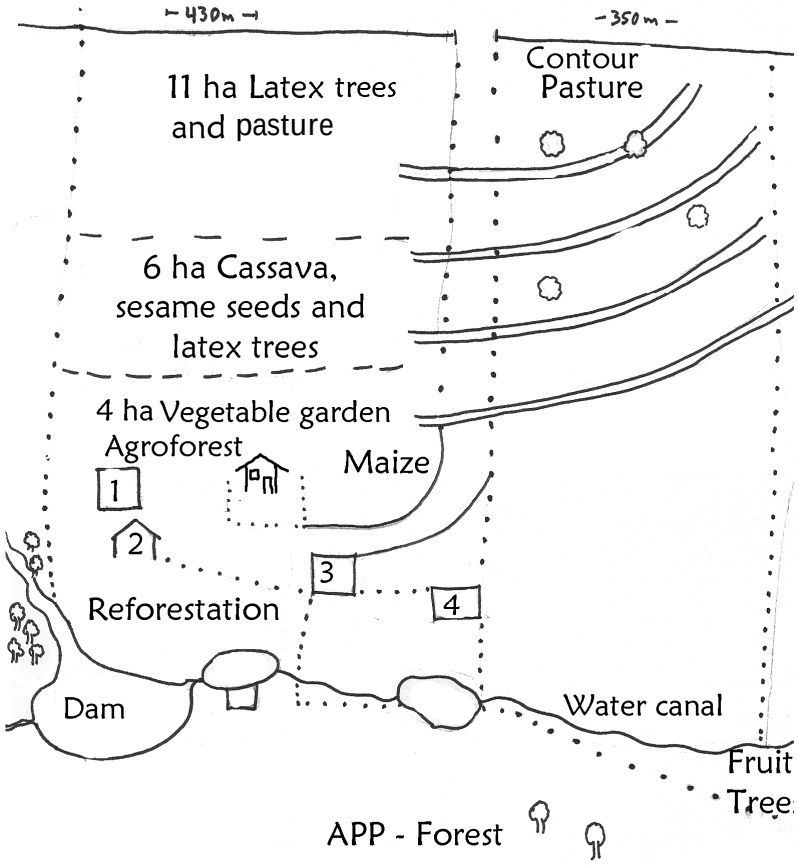
Image 5.10 Alembic brought from Rio Grande do Sul, LRS, Querência, 2010

Elio Randiok (b.1954) and Rosa Randiok (b.1954)

Elio and Rosa Randiok, both born in 1954 in Rio Grande do Sul, were among the most diversified small-scale farmers of Querência. Their production went from cassava and sugar cane for producing processed products, to livestock, an orchard, a vegetable garden and an agroforest for crops for their own consumption. Their farming style may be the most unusual amongst the cases presented in this research; not only were they not producing soybean, but they had embraced agroecological practices as a core aspect of their farming and livelihood strategy. However, their life trajectories as migrants from the south of Brazil, as well as their relations with farming styles– including soybean production at a large scale– had been similar to the experience of the common soybean producer in Querência. Their case exemplifies a trajectory of multiple transitions, broadly from medium-scale farmers in the south of Brazil to large-scale soybean producers in Querência, and from this to *assentados* (land reform settlers) engaged with agroecological farming on a 75 ha plot (see Figure 5.9). By 2010 they had become the central reference of an intra-municipal network which advocated socio-environmental agriculture for small-scale farmers around the Xingu Park and the Low Araguaia region, bringing together civil society groups, NGOs and farmers (see Chapter Four).

In addition to the two previous cases, the Prestig family and Adâo and Arlet, this case of agroecological farming reflects the presence of small-scale farmers in an area with a predominance of medium and large-scale producers of soybean and cattle ranchers. These cases reflect the relevance of small-scale farmers for rural development in Querência, and bring into question the narratives around soybean production and expansion that ignore the existence of these in Mato Grosso (see Chapter Three). Elio and Rosa are relatively capitalised small-scale farmers who make a living from what they produce on their property, as described below. In this sense they do not represent the average LR settlers (see Chapter Four). Instead they exemplify a farming trajectory that is not recognised in the mentioned narratives: that of migrants who could have become soybean producers but who due to particular circumstances have chosen a different livelihood strategy and a farming style associated with agroecological farming. What is more, their case reflects both the difficulties and possibilities faced by small-scale farmers in Querência, situations which are often disassociated from– or are at least not directly defined by– the soybean agri-food systems.

Figure 5.10: The Randiok´s Farm, 2010



Source: Drawn by farmer, adapted by author, 2010

Life history

Both Rosa and Elio come from farming families of German descent, who live in Rio Grande do Sul. They had two sons and a daughter, who were by 2010 of adult age, married and with children. Looking for opportunities and to increase the size of their property, in 1975 the Randioks migrated from Rio Grande do Sul to Santa Catarina where they acquired a 32 ha farm and practised mechanised agriculture. Convinced by the opportunity to have more land, in 1987 they sold their farm and left Santa Catarina to participate in the COOPERCANA's colonisation project in Querência. Elio and Rosa were invited there by a real estate broker– as were most of the first families who came to the colonisation project in the second half of the 1980s. There they bought a 70 ha *chácara*– 500 metres away from the first houses of the village– and another eight *chácaras* that totalled 648 ha, ten kilometres from the village (by 2010 the outskirts of the town of Querência). During the first years they lived off crops planted on the 70 ha

chácara, where they established their house. In 1988 Elio looked for a sugar cane variety that could be grown on their plot to start distilling *cachaça* from sugar cane in the *alambique* (alembic) they had brought with them from Santa Catarina. Later in 1990 they cleared 70% of their larger area with a government loan, where they planted soybean for few years. On this property they gained experience of planting soybean on a large scale and as a monocrop. However, Elio remarks, for "family reasons I had to sell the land".[326]

After selling their land– including most of the *chácara* where they lived, except the section with the house– they started to produce cold meats which provided them with a living for few years. But this did not seem to offer a long term livelihood. As Elio explains "there was a lot of demand, you could make money, but it was too much time [working] for the profit you could make […] then the sanitary regulations and inspections came and made it complicated".[327] At this point, in 2003, they decided to buy land further north and established themselves 140 km from the town of Querência. Once more they were participating in the creation of a new rural settlement, this time a government-managed LRS. Their daughter and one of their two sons also acquired a plot each in the LRS next to that of their parents. However, contrary to Elio and Rosa´s wishes they had not yet moved to the LRS, but were living and working in the town of Querência. The daughter worked as a nurse, one of the sons as a grocer, and the other as a rural labourer on a soybean *fazenda*.

As Rosa and Elio had experience with soybean production, Elio´s particular perspective on the role of soybean production in relation to small-scale producers is considered here to be informed and relevant. Due to his proximity to the farming styles associated with soybean production his is a less confrontational discourse than that expressed in the agroecological narrative (see Chapter Three). From his point of view "soybean generates a profit faster, but ... small producers can't manage to produce soybean. Costs are too high and you need a large area", as also argued in the agroecological narrative.[328] However, in divergence, he also believed that "the world needs grains, rice,

[326] Interview with Elio, 5th March,2010, LRS, Querência.
[327] Ibid.
[328] Ibid.

beans, maize and also soybeans".[329] Furthermore he considered that "soybean is, 'quote, unquote', damaging. If you know how to use [crop] rotation and manage insecticide, soybean is not detrimental. If you don't then it is detrimental […] Yes, ten years of only soybean are going to be detrimental."[330]

Moreover, Elio is not of the opinion that soybean *fazendas* are a threat to the development of livelihoods in the land reform settlement. On the contrary, he observes that the families living on the LRS would be worse off without the employment provided on these soybean or cattle *fazendas*. Instead, he believes that

> "with more support from INCRA and other governmental institutions like the municipal council or state governor, it [making a living on the land reform settlement] will be viable, but without support it will not. This is why the settlement could become a *fazenda* again."[331]

Moreover, in relation to soybean produced on the LRS he pointed out that "there are many settlers who are looking to rent their plots for others to plant soybean [but] it is not because of the settlers, it is for lack of support by the government".[332] In Elio´s perspective the difficulties and challenges for small-scale farmers derive more from the policy process of the creation of the LRS. Neither the existence of large-scale farms around it, nor the motivations of settlers to rent their land out to others for soybean production, explained the limitations that most settlers were dealing with in making a living off the land. Rosa and Elio´s farming style, described below, reflects the multiple dimensions involved– e.g. access to capital and knowledge, socio-economic networks, and individuals' character– in having a relative degree of success as agroecological farmers in Querência.

Farming Style

The plot Elio and Rosa bought on the land reform settlement had initially been given by INCRA to another family. However, according to Elio, the woman was widowed so she

[329] Ibid.
[330] Ibid.
[331] Ibid.
[332] Ibid.

decided to sell her plot.[333] When they moved, the LRS had been in existence for five years, so Rosa and Elio were not initial settlers: they had arrived during less difficult times. Moreover, with their capacity to invest in their plot, be it in improving the soil or constructing infrastructure, they minimised the risks of starting a new farm. This was something that the majority of settlers with low income backgrounds had not been able to do. For example, the Randioks built a simple wood and concrete house with a typical open kitchen, extra rooms for guests and a storage room for a freezer. By 2010 it was surrounded by a flower garden, cultivated fields, and an agroforest: a scene that reflected their hard work and investment in the farm.

The area where their plot was had been part of the pasture of the expropriated *fazenda* where the LRS was created. It was a 26,700 ha *fazenda* where 6,000 ha of forest had been converted into pasture for extensive cattle breeding. The *fazenda* was divided into plots of approximately 60-75 ha, so some of the plots consisted mainly of soil that had been under pasture for around 40 years. As Elio said, "This area was degraded", a problem that settlers had to face (see Chapter Four).[334] Since they arrived there they have used various methods to revitalise the soil. Their plot was on a slope, so one of the first things they did was to make level terraces to control the leaching of nutrients and increase the retention of water (see Figure 5.9). They also corrected the soil acidity with limestone in the areas to be cultivated. This practice, for Elio, "is compulsory if you want to produce in this soil".[335] They had a soil analysis done, which indicated the need to add limestone, a general practice in Querência and one which has become critical to the productivity of the soils there. Based on this analysis and their experience of farming in the region, they added 4 tons of limestone per hectare. Also, in 2010 they were using green manure to improve the fertility of the earth by maintaining a system of crop rotation with maize, cassava, *feijol de porco* (green manure beans), and sesame seeds. In the three years prior to 2010 they had planted a total of 6 ha of latex trees, and other fruit and timber trees, creating a sort of agroforest. All of these practices were geared towards the sustainability of their farming style.

[333] As mentioned for the above cases, the selling of plots in an LRS has not been recognized as legal. However in Querência this was a common practice. In the case of the Radiok family the change of tenure was legally justified because the initial beneficiary, as a widow, was unable to make use of the plot.
[334] Ibid.
[335] Ibid

Elio and Rosa chose these plots, including those of their two children, because they have a *corrego* (brook) running through. Not all the LRS plots have water, a considerable disadvantage for those settlers without. This aspect was underlined as a downside of INCRA's planning, in contrast to the Querência colonisation project in which all plots had a water source.[336] The Randioks' plot also had a dam with fish, apparently made for the use of an unregistered timber mill before they bought the plot; and they created a pond for leisure activities. The way they had organised the location of the crops, Elio points out, corresponded to the humidity and water accessible at different levels. For example both the sugar cane and an orchard of 1,000 diverse local fruit trees were planted closer to the *corrego* where there is more moisture. This careful organisation of the farm contrasts with the quick establishment of Igor and Carol Kurtis´ large-scale soybean farm, where they failed to clear the forest on the most appropriate soil (see above). Furthermore, Elio said they have isolated the riparian forest (APP) and reforested in some areas to comply with the Forest Code as well as to improve their plot. As he says, "today I think it is easier to plant a tree than soybean".[337]

When Elio and Rosa moved to the land reform settlement they brought their machinery from their previous farms, including the *alambique* to distil sugar cane juice and produce *cachaça*. They also had two tractors with equipment that they had brought from the farm in Santa Catarina when they moved to Querência. This indicates their accumulated capital, but also reflects the fact that although they had intended to live as large-scale soybean producers, they had kept the technology that has helped them to keep the production on their farm diversified. Their ability to use old machinery, as in the case of the Prestig family, contrasts with most large-scale and corporate soybean producers who replace and upgrade their machinery more often. The Randioks used their tractors to plough the land and carry the crops about the farm. However most of the farm activities were manual-labour intensive, e.g. cutting sugar cane and harvesting cassava. Also they used one of their tractors as transport from their farm to the village and to other plots within the LRS. Indeed, according to Elio, they had not saved enough money to buy a truck or a van to help them transport their products to the selling points.

[336] Interview with Edio Schwantes, planner of Querência project, 26th June,2010, Agua Boa-MT
[337] Ibid

They work all year round, moving from one activity to another. As mentioned before, in 2010 the main crops they processed in their small agro-industry were cassava and sugar cane. For this they spent time not only producing the crop, but also processing, packing and distributing it. Moreover, with the other crops and livestock to take care of, there was always a need for manual labour. In fact, Elio and Rosa often hired temporary workers and had made partnerships with other LR settlers to plant and process the products collectively. Their annual farming cycle was organised around the sugar cane cycle, as well as the estimated demand for their by-products. Both cassava and sugar cane are crops that can be harvested over a long period compared with other crops that have only few weeks in which they can be harvested (such as peanuts). This gives Rosa and Elio a chance to plan the other activities that might require stricter timing. Beside cassava and sugar cane, in 2010 Elio and Rosa planted two hectares of corn for livestock feed, four hectares of sesame seeds and a small area of peanuts to make brittle, two hectares of *feijão de porco* (*Canavalia ensiformis* or Common Jack-bean) as green manure, and one hectare of cassava for household consumption. When they had extra time they made, among other things, cheese and cured meats for domestic use.

Elio and Rosa also took care of the plots of their two children. Moreover, both the daughter and son were members of the small producers' association to which Elio belonged (see below). Since they could not offer labour, because they worked in Querência town, the use of their land was taken as their membership contribution to the association. The majority of the land on both plots was used for free range cattle. One of the plots had been planted with new pasture, while they left the *fazenda's* old pasture on the other one. On these plots they also had a few hectares of sugar cane, corn and cassava– all used for the small agro-industry– and a swamp area with an orchard for future fruit pulp production. Aside from the use of their children's plots, the Randioks had planted cassava on another LRS plot a few kilometres from their farm for the production of cassava flour in their small agro-industry. This access to extra land, either rented or as an associate membership contribution, reflects their capacity to mobilise resources to improve their conditions as farmers. Elio was convinced that this was possible by working in association with the other settlers.

Within a year of moving to the land reform settlement, Elio was already involved in the board of directors of the school, constructing a church infrastructure, joining the church

activities and in community associations of the LRS with an enthusiasm that exemplifies his entrepreneurial personality. In the association, facilitated by the CPT and formed in 2003 by 30 members, he integrated a subgroup of six families to run a cassava and sugar cane agro-industry collectively. With this group they improved the infrastructure on the Randioks' plot. They constructed a wooden shed to house the machinery as well as a concrete storage room. The initial investment in this infrastructure– R$2,000 per member– Elio explained, had an equivalent in cattle *arrobas* (a unit of weight used in MT), so that the membership could be more easily transferable. However, Elio recognised that after a few years the group had dwindled to just his family, as the five initial members were not participating anymore. For him "there was a lack of understanding and commitment to working collectively: everyone wanted to work at different times".[338] Therefore, in order to maintain production, they had to adapt. Instead of relying on the members' labour they hired other people from the LRS, e.g. some men to harvest cassava and some women to peel and clean it. This is an aspect that becomes controversial when it comes to the official category of Family Farmer, as one defining characteristic is the absence of permanent hired labour (see Chapter Three).

Elio was in charge of distributing the agroindustry´s merchandise. For that he took rides with friends to Querência, 140 km away, where a few supermarkets sold their products. Their familiarity with the consumption patterns and some of the people living in the town of Querência– because they shared migratory origins as *gauchos* from the south with similar culinary traditions, and they had been there together as initial settlers– facilitated their access to these selling points. He also took merchandise to the two grocery shops in the village of the LRS, 10 km away from their farm. Sometimes they also distributed the products in *fazendas.* For example in the past two years the largest *fazenda* in Querência, *fazenda* Roncador, had asked for 500 kilos of brown sugar, Elio remarked. This relation, in addition to the employment settlers get in the *fazendas*, shapes Elio´s opinion of the opportunities small-scale farmers can find from their proximity to large-scale farmers.

[338] Interview with Elio, 3rdMarch,2010, LRS, Querência.

In 2006 Elio was invited to participate in a training workshop for socio-environmental agents provided by the Socio-Environmental Institute (ISA) in the neighbouring municipality of Canarana (see Chapter Four). Afterwards, Elio and Rosa organised a similar workshop on their farm together with ISA and Ernest Göstch, a specialist in agroforests. They planted an agroforest on half a hectare of their plot to create a model for other producers in the LRS. On that day, Elio recounts, around 40 people got involved in creating the agroforest: people who had participated in the course, producers from the LRS and representatives of the rural workers' union and other public organisations. For Elio, this half hectare of agroforest "is an example of what can be done with this technique".[339] They planted approximately 40 species of fruit trees, timber trees, green manure and other plants, such as a few shoots of pineapple and cassava. They started with a *muvuca* of seeds, that is, a mixture of seeds planted all together.[340] Elio enjoyed having this agroforest, to show to others and to see how it evolved. After the workshop they expanded the agroforest idea– not in such a diversified way but taking the idea of a productive forest that does not need to be managed as monoculture– by planting different fruit trees together, for example. From this experience Elio said, "whether we are going to harvest I don't know, but that we are going to plant, I do".[341] This shows a contrasting view to that centred on productivity, very prevalent among soybean producers.

Aside from the relation with ISA and the CPT, the Randioks' farming style is also supported by their relation with Embrapa. Elio and Rosa kept in vivo a stock of varieties of both sugar cane and cassava as a way to maintain the quality and productivity of their crop. They received ten cassava varieties from Embrapa-Cassava, of which they reproduced four that are edible as a root and two that are only for making flour and other by-products. According to him this "has helped to improve the productivity". Moreover, through the municipal secretary of agriculture they acquired varieties of sugar cane also provided by Embrapa. With these varieties they had been able to test which ones adapted better to their soil and which ones are better for making sugar,

[339] Ibid
[340] In Elio's agroforest they planted rocket, onion, parsley, saffron, rice, maize, squash, cucumber, cashew, banana, cacao, and various native fruit and timber trees, such as*barú, piquí, pitanga, graviola, jatobá, mamoniya, muricí,* and *muricirón*
[341] Ibid.

cachaça, treacle or brittle. He considered these varieties as '"technology".[342] Moreover, he believed that "without technology you can't sustain anything; you have to look for improvement. For example [with these varieties] I can improve various aspects of my *cachaça*, like producing around 7,200 to 7,500 litres of *cachaça* per hectare".

As a group the small agro-industry community association had been able to attract training courses provided by both public and private organisations. For example none of the initial members of the small agro-industry group knew how to make cassava flour. They invited someone who knew the technical details for making cassava flour at an artisanal level, but with her help and some boldness on their behalf they scaled up the method and put it into practice, adapting it to their machinery. Some of the equipment to make the cassava had originally been set up in the town of Querência by a private entrepreneur who wanted to buy cassava from the land reform settlers in the municipality. He was not able to set up the small agro-industry so he sold the equipment. Elio traced back the machinery and found out that some of the equipment was not in use and other parts had ended up outside of the municipality. The group then was able to buy the big metal pan where the cassava dough is toasted to become flour. The work necessary for the toasting was what required the most adaptation from what the trainer knew to what they actually had to do. Elio recalls, "this is the hardest step, you have to control the fire at a constant high temperature and have to constantly move the dough to the right point […] we are still looking for improvements to master the process, but not everyone had the patience and capacity, so we had problems [referring to the collective work]".[343]

Elio believes that with these ongoing experiences– the communitarian association and the agroforestry– the participants are constantly learning, which is a critical aspect of the viability of their farming enterprise. As he said "we are still learning and have scope to improve what we do".[344] This learning had involved understanding the whole production chain of the small agro-industry. They had worked around the selection of crop varieties that adjust well to the planting conditions of the settlement; learned about processing and its requirements; and worked to improve production, the quality of their

[342] Ibid.
[343] Ibid.
[344] Ibid.

products and their marketing. Producing a diversity of crops and managing and marketing an agroindustry requires a very different range of knowledge from that required to produce soybeans as a sole crop.

Agrarian dynamics

The story of the Randioks is interwoven with the *gaucho* migrations trends associated with soybean expansion. However, their trajectory and relationship with farming styles illustrate a pathway that is not recognized in the main soybean narratives. A first aspect – that appears also in above cases (see Case Three, Four, and Seven) – is that aside from the production of soybean their livelihood strategies as farmers involve production for self-consumption, and the reproduction and use of knowledge associated with small-scale farming in southern Brazil. In the case of Rosa and Elio the integration of these practices into their livelihood strategies was crucial to saving them from their failure as large-scale soybean producers. A second aspect, of relevance for these soybean agriculture frontiers, is their history of failure with soybean production. This is an aspect that contrasts with the linear success stories portrayed in the agribusiness narrative, as well as with the story of agribusiness and small-scale farming as being incompatible in the agroecological family farming narrative. Their farming style is a case of transition; a process for which policies have been inadequate, partly because transitions are not recognized in the standard broad narratives that influence policy. In the logic of competition and efficiency advocated in the agribusiness view, there is no room in farming for those who fail.

Furthermore, the case of Rosa and Elio exemplifies agrarian dynamics that go beyond those of the soybean agri-food systems. The Randiok family are a success story within the land reform settlements of Querência. They do not fit exactly with the picture of marginal landless peasants who benefit from land redistribution. Instead they belong to the pioneers who benefited from the private colonisations by COOPERCANA, but whose livelihood strategies later led them to move once more to an area (a LRS) recently occupied for family farming. Their trajectory certainly contrasts with that of the stereotypical soybean pioneer. Their persistence to occupy themselves as farmers led them to be part of the family farming that is developing in Querência. Since they once belonged to the trend of large-scale soybean production, they don´t have a completely

negative view of the production of soybean in this area. Their more recent livelihood strategies have involved them in a diversified production and processing of products for the local market. Moreover, their leadership as family farmers has also included the integration of agroecological practices learned from their involvement with ISA and other organizations in the region geared to support small-scale farming. As a case of transition they exemplify the integration of knowledge they had and knowledge provided by other actors.

Their success is not assured, since the conditions in the LRS are difficult (see Chapter Four; Cardoso et al. 2005), ranging from the distance to Querência town – or access to markets – to lack of infrastructure, and generalised poverty, that limit trade within the LRS. The multiple adverse situations show the complexity for the viability of family farming beyond the predominance of soybean production in the municipality. Moreover, the case exhibits the potential synergies of family farming and the development of a town and increased income of the population associated to soybean production. An aspect that has to be considered, particularly when talking about endogenous development, as the agroecological family farming narrative advocates.

Chapter 6

Re-thinking narratives on soybean agri-food systems: hidden differences in farming styles and agrarian dynamics.

The heterogeneity of farming styles and multiple trajectories of agrarian change found in Querência contrast with the simplistic narratives of a singular trajectory of agrarian change at the frontier of soybean production (see Chapter Three). Although there are dominant trends in the farming practices of soybean producers, there are important differences that show more complex agrarian dynamics than usually portrayed. The previous chapter described the livelihoods and farming styles of eight farming cases and how these are interrelated with multiple actors in the soybean agri-food system. This chapter compares the eight cases in order to draw out some themes which highlight the diversity of agrarian dynamics around soybean production in Querência-MT, Brazil. This analysis gives answers to the questions posed at the beginning of the thesis: what has shaped the role of soybean within farming styles? And what are the implications for agrarian dynamics and pathways to sustainability? Five themes are identified: the farmer´s origin and migration trajectories, land use policies, and the relations with labour, technology and markets which have shaped the diversity of livelihoods and farming styles. Acknowledging the importance of these contributes to an understanding of hidden differences and how heterogeneity of farming styles plays a role in agrarian dynamics.

Origins and migration trajectories

> *It had to be proved to INCRA that it was possible to pay for the land and the machinery, and to sustain a family. It was an economic project [...] It was the technical side that defined the size of the plot. It was from this that the 400 ha size came [...] Querência was with other logic. There was no norm of fixed size of plot, each producer decided how much area they wanted [...] Querência was for farmers with money.*
>
> Edi Schwantes, member of COOPERCANA and planner of the Querência colonisation project (1985).[345]

[345] Interview in Xavantina-MT, 4th, May, 2010.

> *I'm a family farmer; both my wife and I work on the farm […] my son is studying agronomy to come back and help me manage the farm*
>
> Antonio Oshemback, Soybean farmer in Querência, with 7,000 ha of land.[346]

The commonly depicted idea that the migration from the south of Brazil brought to Mato Grosso a homogenous group of *gauchos*– who had been small or medium-scale farmers in the south and succeeded in Mato Grosso as large-scale farmers– is contradicted by the diverse migratory trajectories shown in the case studies. In this section it is argued that a simplistic historical account of the migration of people from the south gives the misleading notion that all farmer migrants have succeeded in accumulating capital and acquiring a modern farming life style as large land owners. Moreover, it excludes the stories of farmers who have engaged with other styles of farming, both in the south and in Mato Grosso. A single success trajectory of increasing land and scale of production hides these differences. Likewise, discerning non-linear trajectories, and acknowledging the livelihood strategies behind choices of farming styles, contributes to an understanding of how soybean production is embedded in other aspects of life and livelihoods than those of commodity production, often not recognised by mainstream narratives.

The variety of farming styles built on past levels of asset ownership and accumulation was transferred through migration, and so influenced patterns of agrarian dynamics on the frontier. This is reflected in the eight case studies. Elio and Rosa Randiok migrated to Querência to take on a large-scale farm, where they planted soybean for a few years, but then made the transition to a smaller area on a land reform settlement and now live as agroecological farmers. Adão and Arlet Machado could not afford to buy their own land so for some years they worked as a rural worker and a domestic cleaner respectively, and only later acquired their own land. They live off it with diversified production, including an area of soybean (27 ha in 2010). Fernando and Camila Prestig arrived to work for a mega large-scale farmer (in 30,000 ha) and moved to their own 60 ha plot in a LRS, where they plant 90 ha of soybean in other leased LRS plots. Monic and Lorenzo Graciano had high levels of schooling with which they acquired jobs as civil servants and were later able to invest in soybean production on LRS plots. Hector and Rocio Durero and Lumina and Antonio Oshemback, with slight differences, arrived

[346] Interview in Querência-MT, 18th, February, 2010.

in Querência with machinery and set up medium-scale farms from which they have lived ever since, and which have allowed them to access more land. Igor and Carol arrived highly capitalised. Having transferred from their farm in Goias to set up in Querência in the hope of gaining scale, by 2010 their success was still uncertain, but they were harvesting 3,400 ha of soybean and owned large amounts of land. Grupo Amaggi had plenty of capital, so buying the *Fazenda Tanguro* (of 80,863 ha) represented the expansion of its investment and accumulation strategy to capture market share and maintain their privileged position as a corporation in the soybean agri-food systems. Certainly all these soybean producers required certain initial capital, but its management has led to diverse pathways in and out of soybean production and specific farming practices.

The origin of farmers (in terms of place of birth and having or not having been born into farming families) and migration trajectories (specifically the exposure to farming practices through their life histories) shape producers' knowledge of and relations with particular farming styles. In other words, from the accounts of Querência farmers, the history of their relations with agriculture involves a process of learning the art of farming,[347] whether for soybean production or other crops. In addition, these relations contribute to defining which farming styles they believe to be ideal for their livelihood strategies. Soybean producers in Querência, with few exceptions, migrated from the south of Brazil and have a family background of farming. This is true of all the cases presented, apart from the large-scale farmer Igor Kurtis, who was born in the USA, but also migrated from the south of Brazil to MT. These common origins involve similarities in the farmers' exposure to farming styles and practices around soybean production in other places and at other times. However their migratory trajectories also entail differences that have led to different relations with farming styles.

Before they arrived in Querência, all eight farmers were familiar with the use of machinery, high-yield seeds, agrochemicals, and production of commodity crops. This gave them an idea of the type of farming they could aspire to reproduce in Querência. However, not all the producers had soybean in mind as their sole crop (see e.g. Lorenzo and Monic Graciano, and Elio and Rosa Randiok). Moreover, even if they were clear

[347] This interpretation borrows the notion of agriculture as performance by Richards (1989).

about the farming style they wanted to pursue, they had to go through a process of learning by trial and error when adapting to the different ecological and socio-economic context compared with the south, e.g. adapting soybean production to *cerrado* savanna (cf. Jepson 2003). For the mega-large, large and medium-scale farmers, coming to Querência meant increasing their area of production, and they reproduced their previous engagement with soybean production. The three small-scale farmers had previous experience of mechanised large- and medium-scale farming. However Adão and Arlet, and Fernando and family, did not have their own land immediately after migrating to Querência, but were initially rural workers, which involved a different relation with soybean production and access to knowledge about it. The case of Elio and Rosa differs in that they acquired a larger area than they had had in Santa Catarina, but their trajectory within Querência led them to settle in a LRS, where they have agroecological small-scale farms with diversified crops.

Dietary culture is an example of how farmers' family backgrounds influence their current farming practices, and reflects the embeddedness of their farming styles. The farmers reproduce the dietary culture they inherited from the *gaucho* rural life style from the south, such as producing bread, butter, cabbage, salami, and beef (the exceptions being Igor and Carol Kurtis, and the Maggi Group). The production of food on their land for their own use requires having the know-how and the technology for processing it; much of this a culture of craftsmanship (cf. Ploeg 2008). This self-provisioning is not considered part of the soybean technological package; however know-how about the production of these products is still present in their farming practices. Moreover, while for the large and medium-scale soybean producers this self-provision may serve as a mechanism to reduce costs and maintain their dietary culture, for the small-scale farmers it has been essential to their livelihood strategies and farming styles, as they have diversified their crops with products which have a market in Querência and nearby localities.[348] In the south of Brazil the *produtos coloniaes* (farm products) that correspond to the dietary culture of the *gaucho* farmer have become value-added products with a niche market that family farmers have taken advantage of

[348] The dietary culture in the town of Querência has been predominantly shaped by the migration and social status of the population coming from the south of Brazil. However, waves of migrants with increasingly varied origins (coming to the LRS or to work in the municipality) are influencing the diversity of dietary culture, to which farmers may respond by adapting their production.

(Schneider and Niederle 2010).[349] In sum, even if self-provisioning is at a very small scale compared to soybean production, its practice by large and medium-scale producers demonstrates that their farming styles involve other production than that of a single commodity. In the case of small-scale farmers this know-how and access to relatively simple technology is shown to be crucial for accessing the local niche markets which are forming in Querência.

Apart from the knowledge these farmers had when they arrived in Querência, the resources they came with or had access to were different. Their conditions at the time of arrival, then, were unequal in terms of land, machinery, money, and social networks. The resources they arrived with determined in what way they were able to engage with farming. For example, whether they could afford to pay for the services of clearing forest, or having tractors to farm, influenced the way farmers related to the land, and partly defined the scale of farm they initially planned to manage. This is illustrated with the rapidity and extent of Igor and Carol's forest clearance – which led them to open up an area with suboptimal soils in a single square of 3,400 hectares. This contrasted with Hector and Rocio Durero, who cleared forest relatively slowly, choosing strategically sections of 300 ha and then 200 ha. Thus we see that, even when there are processes of accumulation and improved wellbeing, as the story of successful migration highlights, there are differences, not recognised in the narratives, that relate to farmers' previous access to resources that are then reproduced in Querência. This said, having high initial resources is not an indicator of assured success, nor are low initial resources a definitive condition impossible to change. As the case studies show, there are, for example, farmers with ample initial capital who become bankrupt, farmers with less capital who increase their wealth, and workers who become soybean producers and improve their wellbeing.

When families migrated to Querência, and therefore the conditions that they faced on arrival, is often not considered in the narratives about soybean expansion in Brazil (see Chapter Three). Querência started to be a dynamic agricultural frontier only recently, from the 1990s onwards. Arrival conditions have since changed drastically: from the creation of an urban centre and an increase in services to the consolidation of the

[349] This was also noticed while doing research in the south of Brazil in the soybean production regions (Mier y Terán 2008).

municipality as a major producer of soybean – with all that this involves: land use change, better knowledge of the place, the soil and the opportunities for production with the available technology, arrival of input providers and commodity traders that ease transactions, and so on (see Chapter Four). These changes mean that the difficult conditions for early settlers eased for the latecomers; specifically, settling a soybean farm became a less risky investment and a more certain livelihood strategy. In view of this, it may be that migrants with less capital and a great urge to access land were those with the need and the will to take the risk and cost of settling first. This partly explains the differences and why farmers who arrived at the beginning came with less capital than those who arrived later on, as expressed in interviews with older inhabitants.[350] For example, farmers with more capital and family support, like Antonio and Lumina Oshemback, despite having bought the land at the beginning of the colonisation project, delayed their migration to wait for better conditions.

Of the original population that migrated to start the Querência colonisation project, not all have stayed. Some have migrated again, either because they were not able to make a living or because they were doing well but sought a more promising livelihood in another region; others have sold their land and moved to non-farming activities; others have transited in and out of soybean production, as is the case of Elio and Rosa Randiok who became agroecologists, and potentially of Adão and Arlet Machado, whose diversification may lead them to discard soybean production. Finally, others have succeeded as soybean producers and are confronting new environmental and socio-economic challenges. By this process of diversified livelihood strategies, soybean became the predominant crop in Querência.

Finally, the lives and decisions of these farmers are better understood when taking into consideration their livelihood strategies as households. These are families with strategies of reproduction where future generations are taken into account. The age of the farmers as well as the age and the profession of the children are often elements that shape farmers' decisions to increase their land, and therefore influence their farming practices. In the case of Maggi Group, the livelihood strategies of the Maggi family in respect of the Tanguro Farm correspond to interests that go beyond the family and the

[350] Interview with Genesio Falabretti, Querência-MT, 5th May, 2010; also (Falabretti 2010).

farm, and are shaped more by the characteristics of the corporation, of which the Maggi family is a majority share-holder. The case of Lorenzo and Monic also shows a different view of how the farm figures in the livelihood strategies of the family, as its livelihood is not dependent on access to the land, but more on the maintenance of their jobs as civil servants; nevertheless their investment in soybean production in LRS plots corresponds to a wish to benefit from the soybean boom, as well as to a way to diversify their livelihood strategies for the future. In the other cases the livelihood strategies are more closely intertwined with access to land. The decisions of Antonio and Lumina, and Igor and Carol, to buy more land have to be considered with a view to the future of their children and grandchildren. More to the point this involves a notion of reproduction of a farming lifestyle. Hector and Rocio consider that their children will not take over their land, as they are interested in urban jobs, and have instead, according to Hector, invested in a property in the town of Querência where their children can build their houses. In the two cases of small-scale soybean farmers, their options may be limited by their economic resources, but their strategies to move from being rural workers to owning land involves a rationale about improving their quality of life and therefore that of their children. It is not very different for Elio and Rosa, who decided to move to a LRS and convinced their children to get the neighbouring plots, so they could also be part of their livelihood strategy as farmers, instead of just workers in the town of Querência.

In sum, farmers in Querência have multiple migration trajectories and socio-economic origins. First, they have had different experiences and access to knowledge about farming styles. This has allowed them to arrive in Querência with different projects in mind, not only that of producing soybean as a commodity. Second, their livelihood strategies have been shaped by their previous experiences, in terms of their knowledge, social belonging, or accumulated capital, as well as by the conditions they found on arrival. Third, the process of the municipality becoming a major soybean producer entailed changes in arrival conditions that differentiate early and later comers. While migration from the south to Querência increased from 1985, and then from various states to the LRS in the 1990s, it was in the late 1990s, and more clearly in the 2000s, that capital-owning producers arrived in Querência to plant soybean making this crop the predominant commodity.

Land distribution dynamics and environmental policy processes

> *This region during the process of colonisation was considered of cerrado or cerradão. There are even documents that allowed the producers to deforest 80% of their area. The producers were deceived.*
>
> Rodrigo Junqueira, Deputy Director of the *ISA* Xingu Program.[351]

> *Tell me which other country has such restrictive laws? Where else is riparian forest so well preserved? And how can a farmer make a living from 20% of the farm?*
>
> Lorenzo Graciano, soybean producer with three plots in LRS (180ha), Querência.[352]

> *The producer does not gain anything with a certified responsible production of soybean*
>
> Darci Tosati, medium-scale soybean producer, Querência.[353]

Access to land and land use policies are crucial aspects of how farming styles have been shaped in Querência. As the history in this municipality shows, land access is interlinked with various land occupation projects with particular visions of livelihoods and farming styles (see Chapter Four). The different projects of land occupation on this agricultural frontier have shaped the size and location of the land area accessible to indigenous people, farmers, the public sector, land dealers, companies, and others. The implementation of these projects, with all their contingencies, has influenced the distribution of and access to resources such as land, but also other resources associated with it, such as forest, water, infrastructure, policy benefits, and knowledge. Furthermore, environmental policies and initiatives to regulate land use change and resource management, particularly in the last decade, are being implemented in a highly contested environment in which the heterogeneity of farming styles is at stake.

The cases presented in the previous chapter are related to particular projects of land occupation that began at different times and therefore in different contexts (Figure 6.1). Broadly speaking, the creation of the Xingu indigenous territory was followed in the 1960s by the distribution by the government of mega-large areas. It is in this context that multiple trajectories to access land have to be understood. Indeed, later public and

[351] Interview in Querência, 8th, June, 2010.
[352] Interview in Querência, 14th, June, 2010.
[353] Interview in Querência, 11th-june-2010.

Figure 6.1: Land access trajectories within Querência: from year of arrival to year of last change of land access

Scale of production in 2010	Migration origin	Relation to land access processes, size of land holding (ha), and year of land access		
		Cooperative Colonisation (1985-1992)	**Late Private Land Market (mid 1990s onwards)**	**Land Reform Settlements (1998 onward)**
Mega-large scale (>10,000)	Rio Grande do Sul		Grupo A Maggi *80,863 ha (2002)*	
Large scale (> 1000ha)	Goias and USA		Carol & Igor *10,000 ha (2001)* *20,000 ha (2005)*	
Large scale (> 1000ha)	Rio Grande do Sul		Lumila & Antonio *3,000 ha (1999)* *4,000 ha (2009)*	
Medium scale (100ha >&< 1000ha)	Santa Catarina and Rio Grande do Sul	Rocio & Hector *820 ha (1987)* *Divided: 372 ha (2007)*	→ *Additional lease:* *405 ha (2003)* *200 ha (2008)*	
Medium scale (100ha >&< 1000ha)	Rio Grande do Sul	Monic (1986) & Lorenzo(1990)	→	*LRS (2002)- 180 ha*
Small scale (<100ha)	Goias and Santa Catarina		Fernando (1999) &Family (2000) *Worked in 30,000 ha* →	*LRS (2005)* *60 ha (360 ha)*
Small scale (<100ha)	Santa Rosa, Rio Gande do Sul	Arlet (1989) & Adão (1990) *He worked on large farms* →	*Bought 9 ha (2000) and* *20.7 ha (2004) chacras*	
Small- no soybean (<100ha)	Rio Grande do Sul	Rosa & Elio *731 ha (1987)sold (1992)*	→	*LRS (2003) – 75 ha*

Notes:
1) The initial access to land may be different for each person in a household; here the trajectories are presented as couples.

private projects of land purchase and distributions have transformed many of the large and mega-large land holdings that were devoted to extensive cattle ranching and land speculation. The cooperative colonisation (between 1985 and 1992), the private trade of land (accelerated in the mid 1990s), the creation of land reform settlements (the first one started in 1998), and some land leasing, have created a mosaic of farm sizes and types of land access. There are mega-large and large holdings, large and medium *fazendas*, small-scale *chacareros*, and land reform settlers in relatively small plots.

Some of the mega-large holdings in Querência have stayed in the hands of the same companies or families since the 1960s, such as the *Fazenda* Roncador with approximately 150,000 ha (see Chapter Four). However, other mega-large holdings were acquired or transferred to new owners, mainly through the private land market, as is the case of *Fazenda* Tanguro acquired by Grupo Maggi (see Chapter Four and Five). The change in ownership has enabled the reproduction of land concentration, as well as the fragmentation of some of these areas into large and medium holdings. Moreover, although the concentration of land into single mega-large holdings has continued, the Querência colonisation project and the LRS have been important forms of land redistribution at the municipal level.

The two cases of large-scale soybean producers, Carol and Igor Kurtis and Lumina and Antonio Oshemback, and the medium-scale case of Rocio and Hector Durero, exemplify access to land that came from dividing mega-large holdings. Carol and Igor first bought one of the plots of a mega-large holding that was divided into squares of 10,000 ha. Then, additionally, they bought a cattle ranch of 20,000 ha in the neighbouring municipality. In the case of Lumina and Antonio, they initially acquired a 3,000 ha *fazenda* within the COOPERCANA colonisation project, and a large *chácara* (10 ha) on the outskirts of the town, where they live. However, as their economic condition improved, since their son was going to the agricultural technical school they bought a 4,000 ha *fazenda* in the neighbouring municipality. This is located in a disputed 90,000 ha mega-large holding occupied by medium and large-scale farmers in individual plots, one of them by the Oshemback family, and by small-scale farmers–organised in an unrecognised settlement. Rocio and Hector Durero´s land ownership trajectory is also an example of the redistribution of land, as they were among the early colonists who bought a plot in the 180,000 ha farm that COOPERCANA divided.

However various life events caused them to divide the 750 ha property in two with Hector´s brother, and later on to lease two areas to increase their area of soybean production.

Access to plots smaller than 100 ha has been associated, on the one hand, with the *chácaras* of the Querência colonisation project, and on the other with the creation of LRS (see Chapter Four).[354] Both types of projects involved redistribution of land, but, as will be discussed below, the use of the plots by small-scale farmers is not yet assured, and there are considerable challenges. Moreover, the cases presented show how the access to these relatively small plots has involved different livelihood strategies, associated with specific farming styles and agrarian dynamics. Three different trajectories can be sketched from the cases of farmers that have access small-scale plots. First, Fernando and Camila Prestig, and Adão and Arlete Machado both transited from qualified rural workers in *fazendas* to owning a 60 ha LRS plot and a 28.8 ha *chácara* respectively. Second, Elio and Rosa Randiok had to sell their 700 ha within the Querência colonisation project to buy a 75 ha plot in a land reform project. Third, Lorenzo and Monic Graciano went from being solely civil servants to producing soybean in three land reform settlements as an additional activity. These cases illustrate multiple ways soybean producers have accessed land in LRS: acquiring it as land reform beneficiaries, purchasing, and leasing. Additionally, these different trajectories, none of them recognised in the narratives of soybean expansion, reflect complex processes for the establishment of small-scale farms. The first two trajectories involve synergies in relation to soybean production, the third reveals a conflictive relation between soybean production and the implementation of LRS projects (discussed below).

While some farmers work within the area they have, others expand their area of production by purchasing or leasing land. This expansion has involved pressures to re-concentrate land ownership in the areas that were previously distributed under the COOPERCANA project and the LRSs. However, these pressures are better understood, first, by recognising the range of scales of production that are associated with diverse livelihood strategies and different faming styles, and not solely as a corporate-driven change. Second, it is relevant to consider that Querência is a relatively recent

[354] There are also few cases of urban plots on the outskirts of the town that have been reconverted to agricultural use by small-scale farmers who have found a livelihood strategy in growing vegetables.

agricultural frontier, and that various aspects that shape land use are being defined e.g. use of land in LRS and forest conservation on agricultural properties. These two characteristics are relevant for a nuanced understanding of who produces soybean in LRS and other small-scale farms, and how and why, and what the socio-economic and environmental implications are. We now turn to these.

In the case of the LRS in Querência, the abundant inconsistencies in the implementation of the official plan explain, to a large extent, the high percentage of initial beneficiaries that have transferred, sold, or abandoned their plots (see Chapter Four). These unused plots create a context of undefined land use, and therefore space to contest its use. This is expressed in a criticism of the lack of production in the LRS: "they are not producing anything, they are just living from *bolsa* this *bolsa* that [government benefits]",[355] hence arguing and justifying the need to change the situation, for example by planting soybeans. It is in this contestation that the differences between the medium-scale case of Lorenzo and Monic Graciano, the small-scale case of the Prestig family, and the agroecological case of Elio and Rosa Randiok, can be situated.

All three are officially registered as family farmers. However, Lorenzo and Monic Graciano, by planting soybean in three LRS plots – as an additional income activity alongside their city jobs – are involved in multiple irregularities and can be associated with the much criticised displacement of small-scale farmers by highly-capitalised, monocrop farming. In contrast, the Prestig family have found in soybean production a livelihood strategy enabling them to settle in the LRS. This has also involved soybean production on leased plots or sections, in more LRS plots than are legally permitted per family. Nevertheless, in the meantime other settlers had rented their land as a way of continuing to own it or even live at the side of the rented section of the plot. Finally, the case of Elio and Rosa Randiok, contrast with the narratives as a hidden trajectory, who went from being amongst the *gaucho* migrants to Querência – many of whom became medium and large soybean producers – to settle with some capital on a LRS and become important actors in practising and promoting agroecological farming. The assessment of these livelihood strategies and farming styles gains nuance when

[355] Interview with Lorenzo, 10th,February,2010, Querência.

considering the differences rather than considering them all simply commodity producers per se.

Multiple environmental regulations and initiatives shaped, and are still shaping, farming practices throughout the processes of the Querência colonisation project, the creation of LRSs, and the last decades of land use change (see Chapter Four). The definition of environmental legislation, and implementation of and compliance with initiatives, are complex processes, in which contestation is a constant, as is the case with e.g. the Forest Code, the ZSEE, property licensing, the RTRS certification, and the regulation of agrochemicals use (see Chapters Three and Four). In particular, the definition and implementation of environmental regulations and initiatives has involved the formation of new or reinforced alliances between interest groups. For example, the *I Ikatu Xingu* campaign, RTRS certification (and similar), precision agriculture, and iLPF are all initiatives intended to shape the practices of soybean production, and requiring the establishment of shared understandings and interests.

The case of the highly controversial Forest Code (see Chapter Three), and in particular the APPs and the LRs, is emblematic of the controversies at the farm level and of the creation of related initiatives that shape farming practices. In particular, the preservation of the riparian areas (APP) has become – although not without contestation – an agreed practice in Querência among most producers, specifically medium and large-scale soybean producers, as the *I Ikatu Xingu* campaign illustrates (see Chapters Four and Five). However, in the process of seeking solutions, farmers' choices of how to preserve these areas have defined particular relations with other stakeholders. ISA has been a major actor in the search for practical solutions that involve various groups, from indigenous communities, land reform settlers, political leaders, and elected politicians, to large and mega large-scale farmers.

The cases show that farmers chose strategically how to preserve the APP in their properties. In each case all or most of the APP was either preserved or recovering. For the latter, some had left the sections uncultivated for regeneration, others were speeding the process up by either planting seedlings or applying the *muvuca* technique of mechanised reforestation advocated by ISA (see Chapter Four); others were trying all three techniques. Each of these, particularly the *muvuca*, required new relationships

with particular actors that could provide the technique and the inputs. The recent relations between some large-scale farmers and ISA opened space for innovation in reforestation. The *muvuca* for mechanised reforestation came about from dialogue and experimentation with farmers, which involved combining agroecological indigenous knowledge with the needs of large scale reforestation.[356] *Muvuca* was confirmed by trials on farms as a more ecologically appropriate and less costly technique.[357] Farmers' choices also defined the role of APP within their property. In the case of the *muvuca,* it involves the creation of an agroforest, intended to replicate the native forest and produce fruit for animal and human consumption. In contrast, leaving the forest to regenerate by itself involves less investment, slower regeneration, and less capacity for contributing to environmental services, such as biodiversity conservation and carbon sequestration. The interest of farmers in these diverse reforestation approaches also expresses their different views of the attributes of the APP on their properties. Moreover, the need to reforest has involved farmers in rethinking the value and ecological role of the forest on their properties.

In the case of the Legal Reserve, the controversies and disagreements are much more polarised (see Chapter Four). The requirement to preserve as forest 80% of property located in the Amazon Biome and 40% of land in the *cerrado* within the Legal Amazon has had different implications according to the scale of production, as Table 6.1 shows. The corporate-scale farmer, Maggi Group, planted only 38% of its 80,863 ha, and still created its largest soybean production area. Even the large-scale farmers, Igor and Carol, and Antonio and Lumina, were operating in an area that puts them above the average size in Querência (1,000 ha). In contrast, on medium sized farms, making a living by farming on only 20% of the property, as is required in Querência, becomes a challenge for soybean producers. In this context, as a response to the pressure of scale, Hector and Rocio rented land for soybean and diversified their production with 8 ha of *palmito* palm trees. Furthermore, this pressure, intensified by the government and private enforcing policies (e.g. A*rco de Desmatamento*, and Soy Moratorium), has become a motive for mobilisation, creating a united front against many other

[356] Interview with Eduardo Malta Campos Filho, ISA, 8th June,2010, Canarana.
[357] During my stay in Querência I twice had the chance to visit the *Fazenda Certeza,* where Embrapa and ISA are collaborating with the farmer Neuri N. Wink to test and promote in the field reforestation by *muvuca*, incorported in the iLPF (ISA 2010).

Table 6.1: Areas of owned and rented land, soybean production, and forest and swamp preservation (ha) in 2010

Farming Scale	Mega-large	Large				Medium		Small				
Area (ha)	Grupo A.Maggi	Igor & Carol		Antonio & Lumina		Hector & Rocio	Lorenzo & Monica	Fernando & Camila Prestig	Adão & Arlet			Elio & Rosa
Owned land	12 farms	30,000 (2 farms)		7,010 (2 farms)		372	180*	60 (360)**	29.7			75 (215)**
Owned area per farm	80,863***	10,000	20,000	3,000	4,000	372	180	4 plots of 60 ha and 1 of 120 ha	13	9	7.7	2 plots of 75 ha and 1 of 65 ha
Rented Area	n.d.	800		0		605	0	356	4			1
Soybean Area	30,748	3,400	0	1,400	0	835	160	90 (in 8 plots)	27			0
% of soy area in owned farms	38	26	0	47	0	62	89	0	55	100	85	0
Forest and swamp area in owned farms (APP and LR)	46,655	7,400	16,000	1,600	3,200	133.9	20	24	n.d.			8
% of forest per owned farm	58	74	80	53	80	36	11	40	n.d.			11
Reforestation (% farm)	282 (0.35)	600 (6)	0	7 (0.2)	0	1	0	0	0			3

Note: The Forested area is a rough estimate.
* Corresponds to farmed plots but not officially owned.
** Number in parenthesis corresponds to the area owned as extended family as it is managed together.
***Area of Tanguro Farm in Querência.

environmental initiatives, and particularly opposing the legitimation and reinforcement of the Forest Code. This is the case around the discussion of categorising Querência as Amazon forest or as *Cerrado* Savannah, which would define the percentage of forest to be preserved as Legal Reserve.

The mega-large farmers with farms in Querência are important actors advocating payment for environmental services and the creation of a carbon credit market in Brazil. Blairo Maggi in particular is an influential voice. Having acquired large areas of forest, Grupo Maggi is one step ahead, investigating how to profit from standing forest through carbon credits or forest management. In contrast, in the case of the medium-scale farmers, payment for leaving the forest intact is seen as a far from concrete initiative and they are less eager to believe that it is a real opportunity. Aprosoja, as an organisation that represents them, plays a crucial role in establishing a collective position. In the process, the organisation acts to partly negotiate with soybean producers and convince them of the position to be taken around environmental policies.

In sum, the implementation of the various land occupation projects and the socio-economic dynamics that have unfolded have determined the division of land at diverse scales, beyond a simple dichotomy of small and large. This has created a mosaic of farm sizes that involves a heterogeneity of farming styles. Moreover, different livelihood strategies, farming practices and narratives are formed in the process surrounding land use and environmental policy shaping soybean production. The definition of sustainable agricultural practices in soybean farms in Querência corresponds to a negotiated process. In it, the farmers' narratives of sustainability are infused with the reality lived by them and shaped by their actor-network relationships. The privileged position of corporate farmers within the soybean agri-food system gives them more leverage in defining what agricultural practices indicate sustainable production. This has involved portraying soybean producers as equally capable of adapting to labour and environment legislation, and responding to the sustainability standards set by the corporate private sector. However, it is these corporate farmers who reap the benefits of adjusting to the legislation and standards, such as a premium for non-genetically modified soybeans, and justify the push towards land concentration.

Labour: micro-dynamics of class formation

> *We cannot be treated as criminals; we are producing food and creating employment*
>
> Hector Durero, soybean producer from Querência, 375 ha property.[358]

> *Dealing with humans is not easy; I prefer machines*
>
> Antonio Oshemback, soybean producer from Querência, Two properties, total of 7,000 ha.[359]

Soybean production in Brazil has been associated with slave labour in the past (e.g. Fazenda Roncador in Querência, Greenpeace 2006, 32; see Chapter Three). Indeed, the existence of precarious and illegal working conditions has raised critical concerns and responses within the Brazilian federal government (Repórter Brasil 2008). However, the case of Querência demonstrates a process of improvements in working conditions. In addition, there is a process of stratification of employment contracts according to the specialisation and skills of workers. Indeed, the relationship of soybean production to employment is central to the contestation over the construction of a sustainable agriculture (see Chapter Three). On the one hand, mechanised soybean production has been associated with the reduction of labour per hectare of production, which, it is argued, leads to the expulsion of the population from rural areas, forcing them to migrate to the cities and increase the unemployed population (see Chapter Three; Schlesinger 2006). On the other hand, soybean production is related to an 'increase in productivity per worker', which, it is claimed, reflects efficiency and improvements in the competitiveness of farmers, and is therefore a way of creating employment all along the chain of production (see Chapter Three). In this sense the effects on numbers of jobs generated by soybean production are disputed. However, the dynamics of labour across farms of different scales reflect the existence of diverse patterns of labour relationships, which statistical averages do not capture. Instead, the cases presented here reflect rarely acknowledged processes of labour relationships over time on a farm and in the life history of farmers.

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[358] Interview in Querência, 20th May, 2010.
[359] Interview in Querência, 18th February, 2010.

Labour relations and labour as an asset of production are at the centre of agrarian dynamics (Bernstein 2010). Moreover the use of labour is a key aspect in shaping farming styles. The socio-economic aspects of the relationship between soybean production and labour must be explored in more detail to understand differences in farming practices. It is the governance of labour that becomes critical in shaping farming styles, that is: labour laws, rural unions, type of contracts, types of jobs, and working conditions. In Brazil the institutions that regulate labour conditions, implement labour laws, and oversee compliance of rural workers' rights, particularly the rural workers' unions, are influential in shaping the relations between employee and employer (Houtzager 1998; Medeiros 2001; Thomaz Júnior 2003; O. B. Carneiro 2008). Additionally, the legal and social division between those who employ and those who are employed or self-employed is a particular institutional expression of differentiated rural unions. This shapes the relations between farmers of all categories, including the relations among soybean producers. These all have an effect on differences in farming styles and broader agrarian class dynamics.

This is reflected in the cases presented in this thesis. These can be categorised as those producers who hire rural workers and those who do not (see Table 6.2). The farmers who hire labour have distinct institutional relations. Moreover, they have different ways of organising labour, which involves particular infrastructure and equipment, a structure of job specialisation within the farm, multiple salary arrangements, and formal and informal contracts. This results in diverse practices, not only amongst the *agricultor patronal* (employer farmers) and self-employed farmers, but also amongst soybean producers of different scales. Furthermore, labour is a factor that farmers need to consider in the costs of production. Its management – related to the number of workers, specialisation of jobs, hiring of permanent or temporal workers, and working conditions – has direct implications for the profitability of the enterprise. Therefore, each farmer seeks to organise labour and reduce production costs where possible. Below, the cases are compared in terms of the differences in the number of workers, the process of specialisation of jobs on the farm, the organisation and management of labour, and the types of contracts including the salary schemes (see Table 6.2).

As an asset, the number of workers reflects the scale of production; however the relation between the number of workers and the size of the farmed area is not linear. There are

Table 6.2: Comparison use of labour in eight farming cases in 2010

Farm Case	Mega-large Scale	Large-Scale		Medium-Scale		Small-Scale		Agroecologic small-scale
	Amaggi Group	Igor & Carol	Antonio & Lumina	Hector & Rocio	Lorenzo & Monic	Fernando & family	Adão & Arlet	Elio & Rosa
Self-employed	n.d.	3	2	2	1	6	2	2
Permanent workers	210*	12**	6***	3	0	0	0	1[t]
Temporary workers	n.d.	9 aprox	0	1	1	0	1	6
Total people working in farm[1]	210 aprox	21 aprox	8	6	2	6	3	9
Area of soybean prod (ha)	30,747.7	3,400	1,400	820	160	90	27	No soybean prod.
Area of soybean production per person farming (ha)[1]	146	161	175	136.6	80	15	9	-
Total area	80,863	30,000[a]	7,000[d]	977[e]	180	776[i]	34[o]	216[u]
Total area per worker (ha) [1]	385	1,428	875	162.8	90	70	11.3	24

Notes: * Data from Diario de Cuiabá (2007), no distinction of permanent and temporary; ** 6 on each of two farms (one for soybean production the other with cattle); *** 2 workers and two housekeeper families, two members each;
[t] They work in association.
n.d.- no data available
[1]Total worker as the sum of self-employed, permanent and temporary. The last are included since they work for the whole soybean planting and harvesting season, often more than six months.
[a]Two farms 10,000 ha and 20,000 ha, the second with no soybean planted.
[d]Two farms 3,000 ha and 4,000 ha, the second acquired recently; only 100 ha of soybean planted.
[e]372 ha owned and 605 ha leased.
[i] 420 ha owned 356 ha leased (five plots owned between extended family, and leased area divided in 9 plots)
[o]30.5 ha owned and 3.5 ha of leased land.
[u]75 ha owned 140 ha (1 ha leased by the children)

activities within the farms that are not restricted to farming, such as crop storage in the silo, machinery repairs, and infrastructure maintenance, which also define the number of staff hired on a farm. Besides, these activities have effects on cost management and adding value to the product. This is illustrated in the contrast between the two larger cases – Igor and Carol and A Maggi Group – and the other cases, as these show a considerable difference in the number of people employed (see Table 6.2). The difference in numbers – 210 Maggi and 21 Igor and Carol, compared to fewer than six in the other cases – is not only because of the size of the plot but because of the further activities on these two larger farms, such as storage which requires managing the crop, separating the beans from the husk, cutting wood, tending a fire to dry the crop, and controlling the humidity at which the crop will be stored. During the farming season Igor and Carol hired four workers to take charge of the silo and storage procedures, activities that at times were carried out nonstop for several days. Moreover, they hired

permanently a mechanic who repairs machines during the farming season and gives them a general service in preparation for the next season. The Maggi Group, as well having its own silo and mechanic, has the capacity to hire agricultural technicians and an agronomist on a permanent basis, rather than relying on providers of this service, as the rest of the cases, who pay an agronomist based in Querência. All these activities have implications for the number of jobs created, but also for the capacity of the farmers to manage costs and add value to their product (e.g. getting a better price due to removing the husk for storage, and the chance to sell when price is high).

Moreover, the number of workers changes over time according to the circumstances of the farm; for example, if the farm requires extra activities due to land use increase, clearing forest, or building new infrastructure, more temporary labour is hired, as in the case of Igor and Carol. This has implications for migration processes related to job demand. For instance, the timber industries were hiring labour at the end of the 1990s and beginning of the 2000s, at the same time as various soybean farmers were hiring rural workers to clear forest to plant rice and then soybean. When the illegal sawmills were closed by the government and farmers reduced the clearing of forest, a large number of rural workers became unemployed. Some migrated to other regions, others stayed and tried to find other jobs or plots on the LRSs. More recently, with the increase of capitalised soybean producers in Querência, the demand has changed towards more skilled workers.

Furthermore, the greater number of workers hired within a farm has an effect on the overall composition of the origin of the rural workers populating the municipality. Hector and Rocío Durero and Antonio and Lumina Oshemback had three permanent rural workers per farm (see Table 6.2). Their workers were from the south of Brazil, sharing cultural similarities. As Hector argued “they know about farming […] we have a similar way of working”.[360] In contrast, Igor said, “I hire from many places”.[361] The rural workers on his farm were from multiple Brazilian states: Maranhão, Goias, Rondonia, and Sergipe. These employment patterns have implications for the mobility of rural workers within Brazil, as well as on the cultural composition of the municipality, particularly when these workers have settled on a LRS.

[360] Interview with Hector in Querência-MT, 20th May, 2010.
[361] Interview with Igor in Querência-MT, 25th Feb, 2010.

The scale of production, along with compliance with labour regulations such as differentiated salary schemes according to skills, affects the degree of division of labour and specialisation of rural workers within the farms. This can be seen in the way that working conditions and contracts are managed by soybean farmers, and therefore in their cost management strategies. A general characteristic of all four farms that hire permanent workers (see Table 6.2) is the existence of a hierarchy among workers. This has implications for their living conditions and their salaries. These four farms each employed a farm manager, who among other things is in charge of the other workers. The managers had better housing and higher salaries. In addition, farmers, particularly the two larger ones – Maggi Group and Igor and Carol – defined the formal contracts according to the expertise of the worker, e.g. as a combine driver, a driver of a sprayer, or a general rural labourer who helps with various activities and is usually paid less. While this stratification has to do with the need for specialised skills in soybean production, it also corresponds to notions of management of labour and the existence of labour regulations. Moreover, although there are similarities in how labour is managed across scales of farming, such as having a farm manager, the case studies show that other aspects, such as working conditions and salary arrangements, vary from farmer to farmer.

There are adjustments that farmers have to make when moving to hiring workers. These include acquiring knowledge and skills relating to labour management, workers' rights, contracts, salary schemes, and contributions to pension payments. In the case of the four larger-scale farmers who hire permanent workers, the farm conditions differ considerably compared to those that do not hire permanent workers, particularly concerning accommodation and employment contracts. Hiring rural labour on these farms has involved having the infrastructure to accommodate the workers; provision of food all year, which necessitates hiring a cook, generally the woman partner of another rural worker; and transport to take workers to the town on rest days. Often the workers are accompanied by their families, so the farmers have to have the infrastructure required by regulations to accommodate families, as well as ensuring that children have access to education. The story of Hector exemplifies the changes in the relations with labour that soybean producers are facing in Querência, particularly with the public policy pressures to comply with labour regulations. For more than ten years Hector and his family were living in the *sede* of the farm, with no permanent workers. Then they

moved to Querência town and relied on hired labour; by 2010 the wooden house where they use to live became a storage space, the farm manager and his family were living in a cement house, and the other workers lived in a well built dormitory. This case indicates the improvement in quality of jobs that soybean production can generate in Querência, as well as the costs that these changes are generating for soybean producers when hiring labour.

However there are regulations that define contracts with specific activities for the specialised workers. It is here that some soybean producers hiring workers confront the socio-political and economic dynamics of labour relations. For example, when hiring, Igor and Carol had to consider the willingness of the workers to perform tasks that may not fall within the official contract. This involved informal negotiations where power relations between employer and employee are expressed. The same is true of most soybean producers who have permanent workers and find extra activities to occupy them all year round.

Soybean producers have the option of hiring permanent and temporary workers. This is crucial in managing labour costs. In the case of Igor and Carol, who hire a large number of temporal workers in their soybean farm, the livelihood strategies of each worker are highly diverse. Some have arrived from afar to gain working experience, some migrated to Querência as they had not found a job where they lived, others organise their livelihood by migrating through the year to find jobs in different regions where the working seasons differ, others have plots on the land reform settlement in Querência and undertake temporary work for an income to invest in their plots or to supplement the salary gained during the farming season to survive the rest of the year. Moreover, temporary workers often remain in the town of Querência after the farming season hoping to find another job, but often find themselves unemployed.[362] The role of temporary workers on these farms has implications for these farming styles.

Another area where farmers have choices and may define their farming practices is the salary schemes they choose. Considering the case studies, having more workers implies

[362] Observation commented by one of Igor´s workers (4thJune,2010); and confirmed by Milton Eichholz (interview in Querência, 18thFeb,2010) indicating the increasing population in the low income housing area of Querência town, of which some are unemployed rural workers.

handling different salary schemes, be this because workers are hired with differentiated salaries according to their qualifications and salary ranking, or because the employee has different informal payment arrangements according to the farmer's convenience or as result of negotiations. In the second case, a part or all of the salary is not registered officially. This has direct implications for the pension of the rural workers, as explained by one of Antonio´s workers.[363] Many soybean producers pay workers a percentage of the production as a supposed mechanism to incentivise better working behaviour, but given that this practice is not legal it is not registered as part of the worker's salary. Besides, it implies that the worker's income is affected by productivity and price fluctuations, which does not always result in a better deal for the worker.

The relationship of soybean producers with either of the two rural unions present in Querência shapes the relationship of farmers with the government and other institutions, and produces a division of social groups, or classes.[364] The two unions are the Rural Union – for the *clase patronal* (employer's class) – and the Rural Workers Union – for rural workers and family farmers. The rural unions are organised at different levels – municipal, regional, state, and federal – sometimes reinforcing the social division, sometimes contesting it (Medeiros 2001). At the municipal level the presence of these unions is part of the process of identity creation, of social groups' politics, and the formation and strengthening of particular farming styles. Moreover, these organisations are political spaces of class representation that channel confrontation and negotiation between groups with different farming styles. However, these are also political spaces where differences within the same social group are negotiated. This combination of aspects of unions, class representation and class formation, shapes the relations of soybean farmers with other social actors, workers being one of them, but also between soybean producers, predominantly medium and large-scale producers. Acknowledging the existence of politics and differences among soybean producers, and even among the *clase patronal*, is crucial for understanding the differences in farming styles and agrarian dynamics among soybean producers.

[363] Interview with worker, Querência, 18th Feb, 2010.

[364] Brazil's legislation has official categories that differentiate by social "class", between those that hire agricultural labour and those that do not. The historical origins of this division go back to the 1940s (Interview with Zander Navarro, Brasilia, 12, August, 2012)

The main characteristics that divide the Rural Union and the Workers' Rural Union is hiring permanent labour or not hiring, respectively. This institutional division, which is also expressed in socio-economic relations, defines differentiated relations and access to resources, financial institutions, agricultural extension services, etc, and makes producers subject to policies targeted at either of the legal categories of *agricultor patronal* or *familiar* (e.g. environmental regulations, public loans programs, targeted public purchase of agricultural products, and quotas of private trade from family farmers). The cases presented reflect how these institutional relations affect the farming practices, but also how farmers – not fully conditioned by this institutional division – take decisions according to their own interests.

The case of Lorenzo and Monic, who plant soybean on three plots of a land reform settlement, reflects how policies directed at the promotion of small-scale farmers influence their farming style. Moreover, the fact that they are using the LRS plots to plant soybean as a commodity shows how the aims of these policies are manipulated. Lorenzo participates in the Rural Workers Union, registered as a family farmer as owner of a plot actually owned by his brother (a large-scale soybean producer). The soybean is planted on other three 60 ha plots in a land reform settlement, which in 2009 received electricity directed to LRS though the *Luz Para Todos* (Light for Everyone) program. However, his farming practices are defined by the dominant trends promoted by input providers in order to increase productivity, such as no-till agriculture, adoption of mechanised precision agriculture, use of multiple seed varieties including both GMO and conventional, use of agrochemicals, and so on. Lorenzo circumvents the laws to benefit from the policies directed at LRS and Family Farmers. While he is officially registered as a small-scale farmer, his socio-economic status is of a medium-scale soybean producer, and his social relations are with large-scale soybean producers in Querência, including his brother.

The cases of the two small-scale soybean producers reflect a different picture. These are producers who do actually fit the legal criteria of *assentados* and Family Farmers. In both cases soybean is central to their farming practices and livelihoods, but they also practise diversified agricultural production. They have no relations with either the Rural Union or APROSOJA, as they do not hire labour. In other words they do not participate in the main organisations which discuss the future of soybean production and the agri-

food systems in Querência. This certainly leaves these producers at some disadvantage in terms of access to information and capacity to speak for their interest as soybean producers. This is an informal mechanism of exclusion of small-scale soybean producers on the grounds of access to particular social networks, or as a class division related to the scale of production. In contrast, the mega-large farmers appear as actors with a different relationship with the unions. As a corporation, Maggi does not need political representation through a union. Instead, this large economic actor has direct influence over the municipality and access to higher spheres of negotiations.

APROSOJA is organised as a distinct organisation from the Rural Union. It is meant to represent the soybean producers and serve as a channel of communication. However, across Mato Grosso it uses the same buildings as the *patronal* rural unions, and it is the members of the latter who are members of APROSOJA. This reflects the political stand of this association and also the dominant farming style it defends within the soybean agri-food systems: that of producers who hire permanent labour, and therefore those who have medium or large areas of production. Therefore, as mentioned above, this creates a dynamic that excludes small-scale soybean farmers from the soybean producers' association for not belonging to the same class, the *clase patronal*. There are exceptions of small-scale producers who have relationships with medium and large-scale producers, and they make an effort to participate in the spaces of interaction and exchange of information, particularly demonstration field days, which usually include social gatherings or *churrascos*. However, they do not participate in the meetings of the members of the Rural Union or APROSOJA, where issues around the soybean agri-food system and farming in Querência are discussed. It is in this way that these organisations reinforce the polarity between soybean producers who hire labour and those who do not.

As organisations that channel the political representation of medium and large-scale producers and as institutional spaces for soybean producers to be organised as a cohesive social group, the Rural Union and APROSOJA are subject to contestation by different members. These organisations generate group identity and collective action, often directed by the leadership at the national or federal level. But these are also spaces of dispute among medium and large-scale soybean producers, reflecting internal differences within this social group. APROSOJA acts with the clear purpose of mobilising soybean producers as a cohesive social group. During 2009-2010 it became

involved with a series of politico-economic demands that embraced a diverse range of issues: protest against the Socio-Ecologic Economic Zoning; rejecting the contribution to the pension of rural workers; a legal dispute with Monsanto over the duration of the Roundup Ready (RR) patent in GM seeds and the increase in royalties; promotion of a public-private partnership between Embrapa and Bayer to have more conventional seeds and a competitor for Monsanto in GM seeds; advocating the creation of a national fertiliser industry; and promotion of its own criteria for certified "green" soybean production. These issues are dealt with mainly at the state level, but have implications for farming styles and class mobilisation. APROSOJA functions as an opinion maker and creator of a socio-political and economic network that defends the interests of soybean producers as a differentiated group. It operates as a representative organisation, involving consultations with its constituency, and constantly advocates the "modernisation" of farming practices (see Chapter Three).

In sum, there are multiple practices that differentiate farmers in relation to hiring labour. These create different patterns in the numbers of workers, according to the scale of production, but also in relation to the activities of the farm, which vary through time. Larger scale farmers have a stronger effect on the demand for labour, both permanent and temporary, as well as on the diversity of origins of workers. However, the labour process goes beyond numbers of workers hired. In the case of soybean production in Querência, there has been a process of specialisation of jobs, with the creation of hierarchies and differentiated working conditions among workers. The pressures to adjust to the demand for more formal management of labour, and to comply with labour regulations, are shaping changes in practices as most soybean producers in Querência respond differently. These changes are partly mediated by old institutions, such as the rural unions, but also new organisations such as APROSOJA. It is in this sense that these organs of class representation have functioned as generators of collective actions and creators of particular positions towards the current challenges for sustainability. However, it is relevant to recognise the internal differences among soybean producers as a group: on the one hand, to understand exclusionary dynamics of small-scale soybean producers, and on the other hand, to acknowledge the negotiation and political dynamics that exist between producers, in the formation of an identity of soybean producers.

Technology and markets

> *At the beginning there was no plantio direto [zero-till agriculture], it was with the arrival of millet that it started [...] It was a discourse that considered the environmental – by tackling soil erosion – the economic, and the technical – by making production easier.*
>
> Adão Lari Caumo, Agronomist from Querência[365]

> *The soy affects all the municipality. If the price is low, no one has money, they [soybean producers] fall into collapse due to debts. No one has money to buy fish [...] could it be that the first one affected is the small-scale farmer?*
>
> Milton, agroecological small-scale famer from Querência[366]

> *We work with farmers of all scales. Today we finance 70 ha up to 4,500 ha. The average is 1,000 ha.*
>
> Evandro Moraes, Manager Cargill-Querência[367]

Access to technology and markets is a defining attribute in shaping faming styles (Ploeg 2008) and shaping agrarian dynamics (Thompson and Scoones 2009). Moreover, scales of production are related to the particular socio-technological and socio-economic systems in which farmers are involved. While machinery, seeds and agrochemicals are widely used among soybean producers, usage is different between actors. These distinctions in farming practices challenge the assumed scale neutrality of intensification packages. This is especially seen in the economics of mechanisation, the role of large-scale combine harvesters, and the more recent push towards the use of satellite imagery for precision agriculture. As the production of soybean illustrates, machinery, seeds and agrochemical inputs are shaping farming practices and therefore farming styles and agrarian dynamics.[368] Furthermore, access to markets is strongly shaped by corporate commodity traders. These play a key role in the segmentation of trade by creating a specialised soybean system.

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[365] Interview in Querência, 9th May, 2010.
[366] Interview in Querência, 18th February, 2010.
[367] Interview in Querência, 10th June, 2010.
[368] Although in the south of Brazil there are a still few farmers that farm small areas, 1ha, in a non-mechanised fashion, using animal traction, manual seeders and hand picking (Mier y Terán 2008) this scale of production is conceived as economically unviable, to say the least, and in the case of Mato Grosso non-existent.

Moreover, this technological package of high-yield seeds (including GMOs), agrochemicals and machinery has historically been associated with the industrialisation of agriculture and the specialisation of producers and regions (Goodman, Sorj, and Wilkinson 1987; Mazoyer and Roudart 2010). In the case of soybean production, specialisation is disputed (see Chapter Three). On the one hand, it has been framed as resulting in monoculture production that involves an undesirable process of homogenisation of landscapes and farming systems. It is, in addition, associated with the cooptation of farmers' autonomy through the governance of the agri-food systems at a global scale (Schlesinger, Nunes, and Carneiro 2008). On the other hand, from another perspective, these technological changes are viewed as desirable for agricultural growth. In this view, large-scale farming is argued to be a characteristic of a competitive farmer who can participate in commodity crop markets (EMBRAPA 2004; MAPA 2007). Below, a comparison across scales on the use of machinery, seeds and agrochemicals is presented which complexifies this rather polarised dispute.

Innovations such as precision agriculture technology and the increased scale and working capacity of agricultural machinery are driven by the will to increase production. The number, the size, and the type of machines that producers use reveal the degree of capitalisation, and are features often associated with the social status of producers, and therefore with the identity of large-scale producers. Machinery companies compete to bring to the market bigger tractors, harvesters and sprayers with larger capacity, increasing the area that can be farmed per machine and worker, and reduce the working time spent per hectare. The investment in machinery is high (e.g. US$300,000 for a combine), so it is not a possibility for all producers. This has resulted in the creation of a private financial system to make the machines accessible to producers.[369] For soybean production, particularly at the agricultural frontiers, as Igor pointed out, “companies sell more machinery” and the trend is to buy new tractors and have your own machinery.

However, as a few of the cases presented show, there is also a market and use for old machinery. This featured in the cases of small-scale producers: Adão and Arlet Machado renting services from a rural worker who had his own old harvester; Fernando Prestig

[369] Indeed the difficulties in paying the debt acquired in buying this machinery has caused conflict between producers and financial agencies.

and family relying on second hand tractors and their capacity to repair them; Lorenzo and Monic Graciano buying used tractors from his brother; and Elio and Rosa Randiok farming agroecologically with the tractors they brought from the south of Brazil in 1987. Large-scale producers may also engage in maintaining old tractors and increasing their years of use, often in inventive ways. This was the case of Igor Kurtis who had brought a tractor and other machinery from the USA more than twenty years ago and had moved them with him to each farm he and his family migrated to. Moreover, in Querência he hired as a permanent worker on the farm a mechanic who could repair the machinery, rather than outsourcing this activity.

Seeds too have become a key resource in shaping farming practices. The high yield soybean varieties have been crucial in the increase in productivity, as well as in determining the process of producing seeds to defined standards. In the south of Mato Grosso there is a region which specialises in seed production. This was the first region where soybean was produced in MT and where today the processing industry is located. Querência, as region in the transition of ecosystems, is not considered to have the right conditions for seed production, and therefore all seeds are produced in other municipalities. Nevertheless, not every seed used in neighbouring regions is suited to Querência, so companies have programs of seed adaptation for the region. These involve some soybean producers in Querência – usually farmers that stand out as leaders – to accommodate field tests on their farms every year to promote varieties of seeds and agrochemical products.

The multiple characteristics of seeds are not considered when talking about monocultures. Seeds are not only selected according to their productivity, although this is a main indicator that producers evaluate to make their choices of seed varieties. The diversity of varieties planted reflects the different aspects considered in choosing seeds. Use of multiple seed varieties is a strategy among soybean producers to manage scales of production (e.g. by using seeds with different growth cycles) and losses in productivity from weeds, pest, fungus, droughts and other natural risks (e.g. RR-soybean seeds to facilitate the management of competing weeds, and particular varieties known to resist drought). However, this does not soothe the environmental concerns about the effects of producing only one crop in the same field for many years and in whole regions, and so affecting, for example, biodiversity and long term soil

management. However the recognition of the use of multiple seed varieties among soybean producers independently of the scale reflects limits to the monopolisation of seed production and indicates the importance of adapting seeds to the environmental conditions of the zone. This contrasts with the monolithic notion of monocultures and the understanding of the power relations between producers and seed production corporations as one of absolute control.

Igor planted seeds according to their growth cycle, in order to spread the planting and harvesting times. This meant dividing the whole planting area of 3,400 ha into sections of around 500 ha. This allowed him have double cropping in the same year as a strategy of intensification of production and scale management. Moreover, he used both conventional and genetically modified seeds: the second mainly in the areas that in previous years have proved to have weeds. Finally, he selected varieties that he has planted in previous years, which have shown good results in terms of productivity. In 2010 the provider failed to deliver the conventional seeds known to have high productivity in the region as agreed. This was a general problem in Querência and in Igor's case it created delays in his planting plan, causing losses.

Agrochemicals and fertilisers are also part of the soybean production technological package. In the case of agrochemicals the logic of operation is more or less the same for all producers, the idea being that the crop's productivity takes priority so fertility has to be boosted and all competitors have to be eliminated, be they weeds, fungus or pests. However, producers in the same region use slightly different combinations of products, and differences in use appear. Moreover, each year they have to be aware of new and different fungi and pests that may be present for the first time in their fields, or the build-up of pest resistance to the agrochemicals. The range of products varies in strength and for each there are regulations on their use, although these are not always observed. The case of glyphosate is illustrative. This product can be used before planting, during the growth cycle, and for harvesting. It is only the pre-planting use, to eliminate weeds, that is legal. However, with the increasing spread of genetically modified RR-soybean seeds, glyphosate is also used for weeding during the growth cycle. Moreover, as part of intensification, soybean is dried with glyphosate to speed the harvesting process and to allow the planting of maize in time for the rains. These three usages are practised by Igor and Carol Kurtis, but not in the other cases. Besides, the

costs define how farmers use it. Considered as a expensive product, in 2010 it was available as the patented version sold by Monsanto, or the generic version sold at a third of the price.[370] Less capitalised farmers, such as Adão and Arlete Machado, and Fernando Prestig and family, restricted the use of this agrochemical to one application, during the growth cycle of RR-soy. This reduced the cost and reflected their farming practices (not planting maize immediately after soybean).

The products farmers choose may depend on the local provider they have decided to work with, and these offer different service arrangements, as well as different products. Each retailer is associated with a particular brand or manufacturer. While the relationships created between producers and providers of inputs may be conceived as based purely on an economic transaction, the eight case studies show that the relations with input providers and the companies they represent involve, on the one hand, processes of knowledge exchange, and on the other, social relations that include trust and loyalty. These two aspects reflect the embeddedness of the economic and technological transactions. The cases of Antonio and Lumina Oshemback and Hector and Rocio Durero, who work with the same input provider, reflect the effort made by input providers to establish strong ties with the producers. The arrangement they have is a pre-agreed cost, paid as a percentage of production, for all the agrochemicals needed during the farming season. These are defined by the producer, together with the company's agricultural technician and agronomist, as the season advances. This implies, according to Hector Durero, that the company works closely with the producer, with a shared interest in ensuring high productivity, and undertaking the storage of the agrochemical products and management of any waste. This arrangement reduces costs, as the farmer only pays for what is used (see Chapter Five, case four). According to Hector, this arrangement has reduced the amount of agrochemicals applied.

The relations between producers and input providers reflect the existence of networks of actors who, although they may operate within the same scientific paradigm of agricultural production, have different ways of providing services and inputs, and convincing the producers to be their clients. This creates a scenario of competition and differentiation between producers, as these arrangements define different farming

[370] Interview with Fernando Prestig, LRS-Querência, 28th May, 2010.

practices. For example, establishments in Querência sell inputs mainly to small, medium and some large producers, as the larger producers purchase outside the municipality. The existence of these local input providers is therefore crucial for medium and small-scale farmers. This difference, as mentioned by one medium-scale soybean producer from Querência, creates a common interest between producers and local input providers, shaping a "vertical integration, and strengthening the agribusiness in the municipality", while the large and mega large-scale "*fazenderos* don't believe in the emancipation and progress of the municipality".[371]

The activities of the multiple actors involved in the production of soybean in Querência reflect a process of specialisation that certainly leads to homogeneity, and concentration and control of governance mechanisms in production, in the trading systems, and in the focus of knowledge creation. However, it also shows that producers face diverse choices and often have to be active in the procurement of knowledge on seed varieties, planting techniques, chemical products, market prices, labour and other farming regulations, and so on. While the homogenising effect is associated with the imposition of a package of production and the concentration of power in the governance structures of the agri-food systems (see Chapter Three), the space for producers' choice reflects the spheres in which producers gain a degree of autonomy and have to use it to make their farm or agribusiness competitive in terms of production and profit.

The oligopoly and oligopsony structures, of inputs and soybean trade respectively, in the soybean agri-food systems creates a dynamic in which certain actors have more power to impose ways of doing and define the governance of relations and distribution of value (van Gelder and Dros 2002; Pasquis and Vargas 2010). However, the existence of multiple actors specialised in producing soybean reflects a complex network of coordination and cooperation that goes beyond a simple imposition as suggested by the agroecological family farming narrative (see Chapter Three). Moreover, producers having some room to manoeuvre within the soybean agri-food systems suggests that the construction of consensus between the actors, including producers, is fundamental in the process of socio-technical and socio-economic changes within the soybean agri-food

[371] Interview with Darci Tossati in Querência, 6th June, 2010.

system. Soybean production is thus embedded in a particular context in which relevant differences between regions, and also between farming styles, exist.

Finally, the trade of soybean is critical in the differentiation of soybean farming styles. The relationship between soybean producers and representatives of trading companies and other smaller crop traders has a social component, informal in nature, which creates differences between farmers in their access to market information and trade agreements. These social relations are reinforced by the producers' capacity to buy inputs and sell soybean. The volume of production is often an advantage in the trade negotiations, because of both access to better prices due to volume and the option to sell in more convenient times. Commodity trading prioritises larger scales of transactions. However, as confirmed by the manager of Cargill,[372] and exemplified by the case studies, trading corporations also deal with small-scale producers in Querência (Adão and Arlet Machado sold 35% of its 2010 harvest to Bunge, and Fernando Prestig and family were selling all their crop to Cargill and Caramurú). Nevertheless, as Adâo explained, "for small amounts the trader will never call you when the price is high, you have to look for them". In contrast, commodity traders appear in the daily *rodas de chimarron*, where medium and large-scale producers gather to chat about the market trends and get information from producers about their selling decisions. Although it may seem logical social behaviour, these differentiated relationships create disadvantages for certain producers, particularly an exclusionary effect against small-scale producers.

The mega-large producer, Grupo Amaggi, differs from the other cases as the farm is only a small section of the business, and the corporation is a merchant itself, with its own ports and processing industry. This gives the Group substantial leeway in capturing value from its own production, such as through the premium gained by owning in the Chapada dos Pareci-MT, a segregated production chain for conventional (non-GMO) soybean sold in Europe; or through the recently created RTRS certification awarded to Tanguro Farm (see Chapter Five). At another scale, Igor and Carol Kurtis manoeuvre to maintain the profitability of their large operation, involving large loans and multiple micro-practices to reduce costs and intensify production, such as reduction of soybean husk before storing it, to diminish the discounts in trade (see Chapter Five).

[372] Interview with Evandro Moraês, Manager of Cargill-Querência, 12th June,2010.

In contrast, medium and small-scale soybean producers who do not own storage facilities depend on storage services, mainly offered by the corporate traders specialised in soybean. In the case of Querência, there is a storage facility owned collectively by 37 soybean producers, a *Condominium*, but, as mentioned by Hector Durero, "this is far too small for the needs in storage capacity of its members".[373] The farmers have been unable to act collectively to upgrade the collective silo, according to Hector, because they" are under-capitalised due to the process of expanding area [However] this is changing now that producers are concentrating in the area they have".[374] Likewise, the tendency to increase scale goes hand in hand with self-reliance, which has led farmers to underestimate the value of collective silos. This trend is informed on the one hand by a distrust of cooperatives, having as reference the bankruptcy of COOPERCANA, which had previously been present in various municipalities in the region (see Chapter Four; Jepson 2006b; Bonfanti 2006). On the other hand, this trend is reinforced by the preference of trading corporations for dealing with individual farmers, rather than collectives of farmers that would be able to capture extra value by owning storage. This reflects how the pathways taken by farmers in relation to organising collectively have shaped the farming styles present in Querência.

In sum, the use of machinery, seeds, and agrochemicals for soybean farming involve pressures to increase scale of production, and so shapes the practices of soybean producers. However, soybean farmers find, in diverse ways, room to manoeuvre, adapting their practices to their conditions and their livelihood strategies, including that of gaining more profit from their crops. The different practices demonstrate that soybean farming styles are not homogenous. Therefore there is no single pattern of environmental, technical, and socio-economic effects. Conceiving the soybean agri-food systems as a single structure hides the diverse practices and effects. This is critical to understanding the development effects of the soybean agri-food systems at the municipal level.

[373] Interview with Hector in Querência, 20th May,2010.
[374] Ibid.

Conclusion

The viability of soybean production is not solely defined by the scale of production and homogenous farming practices, as assumed by simplistic narratives. A historical perspective of migratory trajectories and land use contributes to understanding the socio-economic differences that are reproduced and shaped by the agri-food systems. A view of the diverse and dense actor-networks around soybean production in Querência, where differences and agreements are negotiated and contested, contributes to understanding complex processes of flows of knowledge, power relations between actors, and producers' access to advantages. The diverse scales of production are thus shaped by different origins and migratory trajectories, processes of land use policy, and relationships with labour, technology and markets, and are much more diverse than suggested by the simple narratives defining the policy debate.

Chapter 7

Conclusions

In previous chapters in this thesis I showed how the standard policy narratives of soybean expansion in Brazil lack the nuance needed to adequately inform policies and practice. I also revealed how the simplification of complex accounts of farming systems and the hiding of particular aspects of dynamic agrarian change are often highly political strategies influenced by dominant narratives of agricultural development in the country's frontier region. As a result of these misrepresentations and misinformed understandings, important dimensions of farming practice and farming styles are missed.

The cases presented in this thesis show the diverse, complex and dynamic processes taking place in soybean production regions in the country. Acknowledging heterogeneous livelihood strategies and farming styles allows for a more subtle account of the agrarian dynamics around soybean agri-food systems, highlighting the limits of simplistic narratives. As I have argued, farming styles and their differences are best understood by considering life trajectories, processes of resource access, institutional dynamics, including the governance of ecosystems, labour, technology and markets, and processes of knowledge formation.

In this concluding chapter, I summarise my main research findings and discuss them in relation with the three questions I posed at the start of this thesis. I then situate my research findings within the broader academic debates related to political ecology and agrarian change, reflecting in particular on my development and use of a hybrid conceptual model which draws on contrasting, but complementary, bodies of theory – political economy of agri-food systems, policy process analysis and farming styles – to provide a holistic framework for analysing the political ecology of soybean farming systems in Brazil. I also highlight my methodological contribution of using actor-network mapping and cross-scale, case-based comparisons of farming styles to reveal dynamic change in the soybean sector and discuss the generalizability of this approach for analysing agrarian change elsewhere. I then emphasise a number of key policy implications in relation to the three narratives emerging from my findings. In the closing

sections of this thesis, I present some final reflections on how I intend to build on this study in my future research.

Revisiting research objectives and questions

The main research aims of the thesis were to offer empirical insights into how policies and practices related to the soybean agri-food systems are played out, and to uncover the construction of different farming styles within the soybean agri-food systems present in a particular locality. This sheds light on how notions of rural development are constructed and how pathways to sustainable development are seen by different actors and interests. For this, three main questions were answered:

1. What policy narratives frame the way farming – and its socio-economic and environmental implications – are seen by different actors?

In Brazil, three main narratives frame the policy debates around the development and sustainability of soybean agri-food systems. These are embedded in broad debates that go beyond soybean production, and involve views of agriculture and development as a whole. This is seen in the polarised confrontation between advocates of an agribusiness model geared towards commodity exports and promoters of small-scale family farming that see an alternative in land reform and agroecology. A third narrative has emerged to put global environmental concerns at the centre of policy debates. In the case of soybean, this has evolved into multi-stakeholders' initiatives intended to find consensus among the diversity of views. In the policy arena, the agribusiness narrative has a dominant position, it gives impulse to corporate farming embarked on a logic of a single pathway, that of increasing economies of scale, based on a capital intensive, highly mechanized, agrochemically driven farming style. This pathway is highly criticised for its negative environmental and socio-economic effects by both the agroecological family farming narrative and the multi-stakeholder narrative.

However, these three narratives have taken equally reductive accounts of the farming styles and agrarian dynamics of the soybean agri-food systems in Brazil. The lack of nuance is evident in their stereotypical portrayals of soybean producers. The agribusiness narrative sees large-scale soybean farming as a natural and superior way of

producing; in this view, all farmers should embark on that pathway if they want to succeed with their enterprise. The agroecological narrative pits soybean agribusiness against small-scale farming as opposed and inevitably conflictive. The responsible multi-stakeholder narrative recognizes the existence of multiple interests related to soybean agri-food systems. Nevertheless, in these last two narratives, soybean producers are often assumed to have homogenous farming practices and to be bounded and governed by corporate interests. These models or stereotypes of soybean farming contrast with the heterogeneity of livelihood strategies and farming styles present in the municipality of Querência, where soybean production has become the predominant economic activity.

These stances of glorification or demonization of large-scale farming respond to particular interests at play in the political and ideological arenas. It is in this sense that simplification of accounts has a role in the construction of realities. Advocates of large-scale production, such as Maggi Group, conveniently act to produce a positive and unidirectional notion of ways to produce soybean. At a discursive level, the acknowledgement of differences in farming styles would distort this powerful image of the highly productive convoy of harvesters that bring prosperity and move together in a single direction. Groups promoting small-scale family farming have corporate agriculture as a clear opposing actor. Acknowledging diversity of soybean farming styles, particularly in MT, where corporate large-scale soybean production has a strong hold, would distort their image of the powerful interest gathered in a single agribusiness model that acts against small-scale family farming. The actors shaping the multi-stakeholder narrative find themselves carrying forward the same simple dichotomy of large-scale and small-scale farming that shapes the public policy debates. In this thesis I argued that taking into account the more complicated reality of differentiated and dynamic process of agrarian change will lead to a much more nuanced, and so, realist, approach to policy.

2. What farming and livelihood practices exist across farms of different scales in Querência-MT?

In Querência, there are multiple livelihood trajectories and a heterogeneity of farming practices. Moreover, soybean is produced across farms of different scales. When

looking at size of land farmed and owned, amount of tractors, or number of workers, soybean farming practices can be differentiated in a continuum of scales, rather than a simple dichotomy of large and small (see Table 5.1). The differentiation of farming styles relates to livelihood trajectories as well as institutions and organizations, such as colonization entities, rural unions, research institutions, and corporations. Moreover, farmers are situated in networks of relationships with nature, technology, human actors, markets and knowledge, that shape and are shaped by their farming practices. These relationships differ across scales of production, and therefore imply a diversity of farming styles.

The history of land use policies in Querência showed that farming styles have been shaped by processes of land access. First, the land distribution policies have given place to a mosaic of diverse land size properties, in which different styles of farming take place. Second, the more recent debates on environmental legislation and push for compliance have affected the course of action of farmers. This has implied different reactions towards socio-environmental challenges, and therefore set parameters for further differentiation of farming styles, for example, with the search for certification for responsible soybean production, or the procurement of payments for environmental services to forest owners.

The hiring of labour has been a critical aspect in increasing the scale of soybean production. This has involved a dynamic of farming differentiation, at the organizational level – responding to the push for a corporate administration of farming –but also politically with unions and farmers' organizations defining and representing particular group interests. Finally, the relationships of farmers with technology and markets, including the actors involved, also show differences between farming styles. The actors involved in the soybean agri-food systems do not come as a single force and push together in a single direction. Instead, the actor-networks created in relation to different farming styles involve more complicated agricultural and agrarian dynamics. The eight cases analysed across scales of production in this thesis contribute to a deeper understanding of soybean farming styles.

The eight cases present different livelihood trajectories and ways of farming. The Grupo Maggi, with its Tanguro farm, is considerably different from the other cases, as it is a

corporation. The other seven cases are farmers, rather than corporations. They are families that are living in Querência. All, except for Lorenzo and Monic Graciano, who work in the public sector, have agriculture as their main livelihood strategy. They are farmers, in the sense that they have found in soybean a crop that allows them to live from the product of the land, either as the main crop they cultivate or as part of a diversified production. Although the farming styles of the eight differ, the differences do not imply that each case can be classified in a exclusive static category, rather, there are multiple layers and aspects in which differences and similarities are found. Farmers move across these categories in a variety of ways and for a variety of reasons. The study of livelihood trajectories, farm histories, agricultural practices, farmers networks, and flows of knowledge in each of these cases led to identify subtle differences.

The Maggi Group portrays itself as part of the migration process that brought farmers from the south of Brazil to Mato Grosso. However, the trajectory of the Maggi family has allowed them to form a farming style differentiated from the average soybean farmer in MT. The investment capacity of the group allowed them to set in Querência a fully equipped farm of a scale of production that assures profitability and is inserted in a larger, regional investment strategy of the corporation. Various aspects allow the group to maintain a mega-large scale farm: a labour structure with administrators, agronomists, and specialized workers; the capacity to renew machinery; internalized provision of various inputs, e.g. seeds and fertilizers; silos infrastructure; and their own transport and trading facilities. At the field level, productivity is the guiding principle, no-till agriculture the main soil conservation practice, and precision agriculture the state of the art innovation that sets technological standards for large-scale production. Moreover, the Tanguro farm is the largest farm the Maggi Group has, coincidentally they have made it their show-case for several of their sustainability initiatives, including obtaining the RTRS certification. The 46,655 ha of preserved forest (58% of the property), and 282 ha of reforestation, have been integrated to the farming practices, mainly to comply with the Brazilian Forest Code requirements, but also because there are expectations, and Blairo Maggi is lobbying for it, that there will be payments for environmental services, particularly through programmes for Reducing Emissions from Deforestation and Forest Degradation (REDD).

Igor and Carol Kurtis' farming styles represent large-scale production in Querência. The size of their properties (a total of 30,000 ha), the number of workers (around 20) and machines (8), having silos, and their extended network of input providers, makes them capitalised farmers with high potential for accumulating further wealth with the production of soybean. Igor and Carol were able to shift their farm – their capital – from one place to another to embark on a larger scale, producing soybean with land use intensification. As with the Maggi Group, although at a much smaller scale, the Kurtis' farming trajectory exemplifies land accumulation. However, the history of their land in Querência – that of a large land holding of more than 100,000 ha that was partitioned into 10,000 ha plots, of which the Kurtises bought one – tells a story of land division, with land prices increasing, and pressure to occupy land for farming. This division process is repeated in other holdings, as the case of the Oshembacks also exemplifies.

Antonio and Lumina Oshemback and Hector and Rocio Durero represent middle scale farmers in Querência, with 1,400 ha and 835 ha of soybean production respectively. They manage production more or less in the same manner, practice no-till agriculture, use multiple seed varieties, hire a similar number of workers, own almost an equal number of machines, have same providers of agricultural inputs, have shares of the *Condominio* collective silo, and sell their harvest to two or three trading corporations. However, they have a considerable difference in size of owned land, 7,000 ha and 372 ha respectively. This defines agricultural practices that differentiate them. While the Dureros are renting land and diversifying their production with a non-cash crop (8ha of palm trees), the Oshembacks are contemplating large-scale integration of cattle breeding and soybean production. This difference in land owned relates to their life histories. Hector had to split his property with his brother, and the Oshembacks have been able to invest in a new farm, contemplating that their children will take over in the near future. They both represent possible pathways of farming that differ from that of a corporate style. They pertain to an emerging middle-class of farmers.

In the context of Querência, Lorenzo and Monic Graciano, Fernando and Camila Prestig, and Adão and Arlete Machado are small-scale soybean producers. This is seen in their volume of production, the lower capital in machinery, and their membership in the rural workers union. However, their farming styles differ. The Gracianos differ from all other cases in the sense that soybean production is neither crucial not central to their

livelihood strategies, it is mainly a side income-generating activity. Their case is an example of the occupation of a land reform settlement plot by people that have capital and take the risks of transgressing the legislation that defines who can be *assentados* (land reform settlers). In contrast, the Prestigs and the Machados have used soybean as the crop that allowed them to transit from being rural workers in soybean *fazendas* to creating a livelihood as family farmers. They both have a diversified production and produce food for self-consumption. However, while Fernando and Camila Prestig are expanding their area of production and making soybean for export more central to their farming practices, Adão and Arlete Machado have integrated soybean as a cash-crop for rotation with the other crops, for soil management, and as feed for their livestock, making it a secondary crop after cassava.

Finally, Elio and Rosa Randiok, similar to the Prestigs and the Machados, represent farmers that have had access to relatively small plots and through farming diversification have found a way of living. However, the story of the Randioks represents that of early Querência migrants, whose livelihood strategies were linked more to the reproduction of the family farming of southern Brazil, rather than to large-scale soybean production that came later. As is the case with other early migrants in Querência, the Randioks tried to live from soybean production but failed, in the process they have used their human and capital resources to practice other pathways of farming. They represent pioneers that have succeeded in establishing a family farm in a LRS, and more recently embraced agroecological farming. In their particular case, they moved to a LRS. Others with similar trajectories have moved to *chácaras.* In this situation, the Randioks represent farmers that are contributing with some capital to provide dynamism to the socio-economic activity within the LRS.

3. How does this all shape the role of soybean within farming systems – and what are the broader implications for agrarian dynamics and sustainability?

Soybean has certainly been moulded into a commodity crop, and its characteristics have enabled humans to integrate it into complex global agri-food systems. As such, soybean has had a crucial role in the construction of corporate, agro-industrial farming systems in Brazil. However, soybean has also been a fundamental crop in the formation of various other farming styles besides corporate, large-scale, mechanized soybean

production. This has implied a highly differentiated and dynamic process of agrarian change. Therefore, a more complex discussion about the pros and cons of different scales of production, and the potential for environmental gains within farming styles, is needed to avoid simple oppositional perspectives that favour either forest or farms, or hi-tech soybean or small-scale agroecology.

When situated in the history of Querência, the corporate farming of the Maggi Group – expressed in the *fazenda* Tanguro – brings to light power relations and the contrast between different soybean farming styles. The Tanguro farm, as one of the few mega-large scale farms in Querência, has an effect that other soybean farms do not have. As a global actor it has the power to engage in shaping what economies of scale are and should be. In other words it influences the standards of scales of production within the soybean agri-food systems. Moreover, it has an effect on how soybean producers should respond to the challenges of sustainability, influencing its current definition. The Maggi Group, as well as other capitalised soybean producers, arrived in Querência after the early migrants, who had already pursued a minimum of conditions to make farming a viable livelihood strategy, including soybean production. In this context, the arrival of this mega-large scale farmer resulted in a further consolidation of soybean production as a predominant crop in the region. Its effects are shown in the increase in volumes of production, the effects on labour – causing migration and skills training of rural workers exclusively for soybean production –, and, over all, the movement of resources, for example, loans for farmers, agricultural inputs, and investment in infrastructure. In addition, it legitimizes the high concentration of land – through a discourse of efficiency, intensification, state of the art technology, and sustainability – and exerts a push to increase the scales of production even more, which involves further concentration of resources, including land, forest, and water. However, even if the magnitude of its effects is proportional to its scale, this mega-large corporate farming style does not characterize all soybean production in Querência, it is, rather, one of the multiple farming styles present.

Soybean has allowed the formation of large, middle, and small-scale farming, in fact an array of scales. Furthermore, livelihood trajectories related to these diverse ways of farming show that moving along farming styles is an aspect of agrarian dynamics. Soybean production has played a role in these different pathways of farming. The

recognition and further study of these trajectories can bring insights to find a more plural response in the search for sustainable agriculture. Certainly, within the soybean agri-food systems, there are forces pushing for constant increases in scales of production, but scale is not the sole aspect determining farming practices. Concerns about soil, water, and forest conservation are also shaping ways of farming in Querência. For example, all farmers across-scales, from Igor and Carol Kurtis to Elio and Rosa Randiok, were engaged in some type and degree of diversification of production, with crops such as maize, rice, cattle breeding, palm trees, rubber trees, and cassava. These practices respond to livelihood strategies, and have diverse implication for soybean farming sustainability (social, environmental and economic). Nevertheless, a durable and resilient integration of this diversification within the soybean agri-food systems requires further participation of other stakeholders. Narratives ignoring this array of practices would limit the potential broader transformations of the agrarian dynamics of soybean farming styles.

The different farming styles and class dynamics in Querência show that the trend of corporate farming involving wealth concentration and a particular way of farming intensification parallel the strengthening of a middle class of entrepreneurial farmers. They practice diverse ways of farming, with diversification of production, iLPF, and organizing cooperatively for example. They can contribute enormously to the sustainable production of soybean. Assuming that these operate in the same way and have the same effects as mega-large farmers contributes to ignore other pathways for sustainability. The importance of this is reflected in the effort to change farming practices and the way the environmental challenges are perceived in Querência, for example with the campaign I Ikatu Xingu (see Chapter Four). The changes are slow e.g. agreement to preserv the riparian areas, reforestation, improvements in working conditions, and discussing environmental problems, but the main actors making these adjustments are these middle soybean farmers that live in Querência, and not only the corporate farms. As shown in this thesis there is divergence among soybean producers (see also Azevedo and Pasquis 2009; Brannstrom 2011), therefore recognition of their different farming styles will contribute to a better understanding of the current changes and improve proposals for further transformations.

Political ecology of soybean agri-food systems

The thesis offered contributions to the rural development studies of farming styles and agrarian dynamics. This research has relied on different bodies of theory – political economy of agri-food systems, policy process analysis and farming styles – to develop a hybrid conceptual model, which provides a holistic framework for analysing the political ecology of soybean farming systems. This has allowed reconsidering the political economy often used in agri-food systems studies. This study showed that a livelihoods and farming styles approach, with a political ecology and policy process theoretical lens, was fruitful in the search for a subtle account of the agrarian dynamics around soybean agri-food systems. This study has expanded the search for diversity from focusing on small-scale farming (Ploeg 2000; Schneider and Niederle 2010) to finding diversity across-scales, particularly among soybean producers that are generally conceived as an homogenous group.

The thesis also broadened the political ecology methodologies by combining actor-network mapping, a cross-scale comparison of farming practices, and a narrative analysis. The actor-network mapping contributed to an understanding of the relationships of farming styles with multiple-levels in which stakeholders interact. Without losing the focus of analysis, which was farming styles, farmers' practices and views were studied as dynamic and in relation to structuring forces that were not limited to the commercial and technological relations of a commodity. With an actor-network mapping, it was possible to situate farmers' socio-technical, socio-economic and socio-ecological relationships across scales of analysis. This led to understanding differences in farming styles beyond the simple one-dimensional views that consider that relations with corporations through production of a cash-crop define, in its totality, a farming style. This study highlighted the importance of migratory trajectories, patterns of capital accumulation, land use policies, and relations with labour, technology, market and knowledge in the shaping of farming styles and diverse livelihood strategies.

Furthermore, the actor-network mapping was fundamental to give this cross-scale case study a degree of generalizability. Situating each of the eight farming cases in a broader context allowed me to assess the aspects that define the particular farming style of each case. Although there are specificities of Querência as a dynamic agricultural frontier, the

historical linkages of farmers to actors that have influence in other municipalities and at other levels, e.g. state, national, and global, allow us to think that the farming styles unfolding in this municipality are not unique, but form part of broader agrarian dynamics. Nevertheless, this research was not intended to generalise to all soybean production regions; on the contrary, a contribution was to study the specificities. The potential pathways to sustainability of soybean production in Querência are shaped by the specificities that shape farming styles.

Re-thinking soybean farming pathways to sustainability

The thesis' most important contribution to the studies of agrarian change challenges the three main narratives framing. I argued against dichotomous visions of agrarian dynamics, and this study has shown that a diversity of farming practices and livelihood trajectories exist in Querência, Mato Grosso. However, what are the policy implications? What does all this nuance and these non-static (dynamic) categories mean for policy and practice? These questions are answered here in relation to each of the three broad narratives that shape the policy debates around the soybean agri-food systems and their pathways to sustainability.

Within the agribusiness narrative, there is the belief that comparative advantages – defined narrowly in terms of farming scales and management efficiency – condition who stays in and who stays out of soybean farming. In reality, micro-practices, or day-to-day decisions, allow more varied responses than those expressed in this standard narrative. For example, crop diversification, food self-provision, land lease, soil management, household planning, labour organization, technology adaptation, and market relations. These micro-practices differentiate farming styles, and reflect a multidirectional process of construction of pathways to sustainable agriculture. At a broader scale of analysis, changes in these practices by different farming styles contribute to the adaptation, resilience, and processes of transformation in the soybean agri-food systems. Rather than focus only on improving management of increases in scales of production, policies for sustainable agriculture can benefit from acknowledging and enhancing various pathways of soybean farming. This can be done by giving value to the existing diversified production rather than enhancing the notion of monocultures; by exploring further the role and responsibilities of farmers in the

locations of their operations rather than assuming a trickledown effect from further soybean production; by allowing and promoting a more democratic debate about environmental implications and a search of solutions within the soybean production networks; and by reassessing the assumption that small-scale farming is not viable, thus avoiding ideological biases against it.

The agribusiness narrative is deeply rooted in Brazilian history and the groups that reproduce it are likely to continue to advocate for a positive view of commodity production and the success story of agroindustrial development. It would not be in their interests to recognise the role that different farming styles have had in the expansion of soybean production. Moreover, the preferred portrayal will continue to be of the thriving farmer managing an ever larger farm, with the possibility of all becoming mega-large scale farmers. This will contribute to further investment in road infrastructure, incentives for purchasing new machinery, and using of agrochemical inputs, along with other policies that contribute to the expansion of soybean production. Nevertheless, in the same way that an array of scales of production continue to exist in the south of Brazil (Frantz and Silva Neto 2005; Mier y Terán 2008), where soybean production started in the 1960s, it is possible to expect that the current diversity in Querência will not fade away.

The different farming styles in Querência reflect that agribusiness is socially constructed (see also Castrillon 2007; Heredia et al. 2010), and that the push to increase the scale of production is not an inevitable economic trend. Sooner or later the limits to expand soybean fields and increase the scale of production would become a generalized problem for soybean producers themselves, through the inefficiencies of large-scale operations, overproduction, land degradation, scarcity of land, and so on. The recognition of different farming styles, and therefore the awareness of the social construction of the systems that make them possible, is relevant to deal with the environmental and social challenges with more flexibility. One of this social aspects is the participation of farmers in processes of knowledge creation, important for the construction of sustainability in soybean agri-food systems. This participation is reflected both in farmers´ craftsmanship that influence the farming styles – present in food self-provision, and use of old tractors, for example – and in the adoption and adaptation of technology for soybean production within socio-technical networks. The

strengthening of this participation may contribute to reduce the concentration of wealth and power in the soybean agri-food system. The creation of a cooperative of soybean producers, among other activities, reveals that there are interest groups with strategies to overcome challenges different from those of mega-large corporate farms.

The simple dichotomous vision expressed in the agroecological family faming narrative does not leave room for the existence of farming styles between the large-scale corporate farmers and the small-scale family farmers. Nevertheless, most soybean producers in Querência are large and medium-scale farmers, and their views and farming practices differ from those of corporate farmers, such as Grupo Maggi. Their livelihood strategies and farming styles reflect more complex dynamics within the soybean agri-food systems than those argued by this standard narrative. On the one hand, the distinction among soybean farmers allows for a better understanding of the local political dynamics that are undermining development in LRS and weakening family farming. For example, in Querência not all soybean producers, nor their farming styles, are related to the exclusionary effects over small-scale farmers associated with agribusiness soybean production. The occupation of LRS plots by non-land reform beneficiaries, the deviation of resources meant for family farmers, and the delay in implementing policies directed to small-scale farmers are agrarian dynamics related to socio-political processes that are not bound solely by the existence of a corporate soybean agri-food system. The search for enhancing the viability of small-scale farming will find more avenues not directly related to the predominance of soybean production, for example creating demand for family farming products. On the other hand, acknowledging that soybean has multiple roles in small-scale family farming in Querência is a necessary first step to have policies, both private and public, that would reduce the bias towards large-scale production. Soybean production at a small scale will continue in areas like Querência where soybean production is predominant, even more with government incentives to include family farming in the production of biodiesel. Therefore, the integration of soybean as a cash crop, for soil improvement, and as a rotation crop within processes of settling in land reform settlements has to be further studied, and its role in aiding transition processes to consolidate family farms considered.

The conception of the soybean agri-food systems as mainly driven by multinational corporations, and the belief that the change in governance practice by these can create critical transformations in soybean farming practices, have led environmental NGOs to advocate for initiatives that involve negotiations with these powerful corporate players. This has been crucial in breaking an impasse in environmental policy, and temporarily strengthening the government actions to enforce compliance of environmental laws. However, as the Maggi Group case shows, the corporations have not needed to adopt, at the farm level, radical alterations in their *modus operandi*. The participation of the corporation in environmental initiatives, such as the RTRS, and the company's public relations strategies, have given further legitimacy to the Maggi Group's role in shaping soybean pathways to sustainability on their own terms. Particularly, differences in scales of production have been secondary in these multi-stakeholder initiatives, with the important exception in the RTRS of the recognition of small-scale soybean production. However, further efforts in these initiatives to include a broader array of actors can contribute to stronger and more widespread effects, especially including middle-scale farmers, who often have more proximity with the locality in which they live and therefore more stake in improving ecological management.

Partly through the process of negotiation, but also as result of the NGOs' strategic decision, land concentration and the implications of increasing scales of production were left off the discussion table. These initiatives would benefit from re-thinking the role of influence attributed to corporations at the farm level, and acknowledge the importance of the dynamics among other scales of production, and therefore farming styles, to potentially enable a broader forum of dialogue, and solutions. Furthermore, going beyond the notion of the predominance of large-scale farming and homogenous development can also contribute to finding relevant differences between soybean production regions; and therefore recognize pathways that have had less negative environmental and social impacts, e.g. less deforestation and reduced marginalisation of small-scale farming. Differences that can lead to certifications based on sustainable practices of a particular area.

Future research directions

This research has opened the scope for further exploration of the agrarian dynamics around the soybean agri-food systems, particularly the processes of movement of farmers across farming styles. Having a multi-dimensional understanding of ways of farming gives the chance to explore further the exit and entrance points to different farming pathways. It is then relevant to ask: what are the dimensions in which policy can contribute to enhance the positive dynamics between different farming styles? And, how can the recognition of diverse ways of farming break through the entrenched political positions that embrace simple dichotomous views of who produces soybean, how and why?

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Appendix I: Interviews information and dates

STAGE 1 INTERVIEWS – September-November 2009			
Date	**Name**	**Title/institution**	**Location**
22nd September	Walter Belik	Prof. UNICAMP	São Paulo
28th September	Fabio Vaz Ribeiro de Almeida (Secretary - Magda)	ISPN- Instituto Sociedade, Populacão e Natureza	Brasilia-Brasilia, Bloco B, Sala 101 a 104
1st October	José Garcia Gasques	Coordinador Geral de Planejamento Estrategico - CGPE/AGE - MAPA	Brasilia - Esplanada dos Ministerios Bloco D- Anexo B- Terreo 7o andar, 748
2nd October	Rosemeire Santos	Assesor Tecnico CNA	Brasilia
2nd October	Anaximandro Doudemet Almeida	Assesor Tecnico CNA	Brasilia
7th October	Leonice Aparecida de Fátima	Prof. UFMT - History	Cuiabá
7th October	Felicio Guilarde	Prof. UFMT - Sinop – Education	Cuiabá
7th October	João Carlos Barrozo	Prof. UFMT - NERU	Cuiabá
15th October	Flabio Nolaso	Prof. UFMT - Geography	Cuiabá
16th October	Alexandre Magno de Mello Faria	Prof. UFMT – Economia	Cuiabá
16th October	Vitor Hugo Garbin	Consultancy Fam. Agri.-MDA	Cuiabá
20th October	Gilberto Vieiras	Coordinador - CIMI	Cuiabá
20th October	Luiz Nery Ribas	Gerente Tecnico APROSOJA	Cuiabá
20th October	Franciele Dal'Maso	Supervisora de Campo APROSOJA	Cuiabá
23rd October	Aprelino Carlos Tenedini	Assesor Clovis de Paula-vereador	Campo Novo dos Parecis
23rd October	Antonio de la Bandera	Vice-presidente Sindicato Rural	Campo Novo dos Parecis
23rd October	Jane Eire P. Castro de Moura	Secretaria General Sindicato Trabalhadores Rurais	Campo Novo dos Parecis
23rd October	Sergio C.B. Stefanelo	Producer - ex-prefeito	Campo Novo dos Parecis
24th October	Vitor Herklotz	Producer	Campo Novo dos Parecis
24th October	Ivana Pezzi Giacomet / Bruno (son)	Producer	Campo Novo dos Parecis
26th October	Clovis de Paula	Vereador / Agric. Fam.	Campo Novo dos Parecis
26th October	Farmer	Agric.Fam - Eucalipto	Campo Novo dos Parecis
27th October	Paulo Carvalhio	Commercialisation - Grupo Webler	Sapezal
28th October	Irio Del Maso (padre Franciele)	Producer	Sapezal
28th October	Renato Scariote	Producer - Coop. Comasa	Sapezal
28th October	Jose Maria	Agronomo Sindicato Rural	Sapezal

STAGE 1 INTERVIEWS – September-November 2009			
Date	**Name**	**Title/institution**	**Location**
28th October	Lucidio Zilli Pinto	Producer	Sapezal
28th October	Fernando Paim	Secretario de Agricultura	Sapezal
29th October	Otto Fritsch	Producer	Sapezal
30th October	Ademir Rostirolla	Pres. Sindicato Rural	Campos de Julhio
30th October	Dirceu Martins Comiran	Producer - GirasolOleo	Campos de Julhio
1st November	Delmar Giongo	Secretario Agricultura	Campos de Julhio
1st November	Darcí Vargas	Producer	Campos de Julhio
4th November	João Flávio Veloso / Lineu	General-director of Embrapa-Agrossilvipastoril	Cuiabá-Sinop
5th November	Flavio Jesus Wruck	Agron. Embrapa	Sinop
6th November	Munefumi Matsubara	Producer – iLP	Sinop
6th November	Agenor Vicente Pelisa	Producer - iLP- Agropel	Sinop
6th November	Invaldo Weis	Producer – iLP	Sinop
7th November	Eliandro Zaffari / Evangelista Barrous / Fabio Oliveira	Field supervisor-APROSOJA, fiscal worker, agronomist son of a producer from Sorriso	Sinop
9th November	José Carlos Suzin	Pres. Sindicato Trabalhadores Ruraes	Sorriso
9th November	Elso Posobom /Pozzobom	Pres. Sindicato Rural	Sorriso
9th November	Marico Kuhn	Agricultural Secretary - transit	Sorriso
10th November	Alfeu Augusto Trecente	Club Amigos da Terra – CAT	Sorriso
10th November	Nelsou Luis Piccoli	Aprosoja-Sorriso	Sorriso
11th November	Amilton Oliveira	Producer / Fertilizers Sale	Lucas de Rio Verde
11th November	Madre in charge	Inst. Padre João Peter	Lucas de Rio Verde
11th November	Claudiomir Boff	Sec. Sindicato Trabalhiadores Ruraes	Lucas de Rio Verde
11th November	Luciane Bertinatto Copetti	Sec. Agricultura e Med. Amb.	Lucas de Rio Verde
11th November	Sestilio Jose Marco	Producer and town pioneer	Lucas de Rio Verde
19th November	Public hearing for Forest Code		Cuiabá
20th November	José Geraldo Di Stefano (Cipo')	Embrapa-Beans	Cuiabá
23rd November	Airlindo Cancian	Producer	Canarana
23rd November	Paulo Ramos	Producer	Canarana
23rd November	Marcos da Rosa	Pres. Sind. Rural	Canarana
24th November	Paulo Ramos - visita Fzd.	Producer	Canarana
24th November	Eduardo Malta Campos Filho	Instituto Socio Ambiental – ISA	Canarana
24th November	Eliane de Oliveira Felten	Secretaria de Agricultura	Canarana
24th November	Olmar Goldon	Pres. Sindicato Trabalhadores Ruraes	Canarana
25th November	Antonio Claudio / Flabio (son)	Producers	Querência
26th November	Irio & Romeu	Agronomo Consultant /	Querência

STAGE 1 INTERVIEWS – September-November 2009			
Date	**Name**	**Title/institution**	**Location**
		Producers	
26th November	Fernando Perin	Agr. Empaer-MT	Querência
27th November	Sr. Daltro	Sec. Agricultura	Querência
27th November	Neuri Norberto Wink	Prod. iLP, Vereador	Querência
27th November	Elias Schmitt	Prod. Land Reform Settlement	Querência
27th November	Marcelo da Cunha Marinho	Rural Union Accountant	Querência
28th November	Eleandro Mariani Ribeiro	Pres STR	Querência
28th November	Maria de Fatima Ferracini and Euclides Ferracini	Agric. Fam. Brasil Novo - Womens' Farmers Group Coordinator and President of Settlers Association respectively	Querência

STAGE 2 INTERVIEWS - February-August 2010			
Date	**Name**	**Title/institution**	**Location**
28th July	Nilson Figueiredo	Assessor-Ministerio Planeacao e Orcamento	Brasilia
20th August	Gilson Betancurt	Ministro da Fazenda	Brasilia
5th August	Vicente Pulh	CONAB	Brasilia
6th August	Nilva Clara Costa	CONAB	Brasilia
6th August	Jasid	CONAB	Brasilia
17th August	Luis Rodrigues de Oliveira - assitentes- Claudio, Rodrigo, Eduino Lorenzo	Ministerio Medio Ambiente-MMA	Brasilia
12th August	Zander Navarro	Investigador-MAPA	Brasilia
9th August	Regilane Fernandes – Teca	Projectos Agric fam – MDA	Brasilia
17th August	Cesar Oliveira	INCRA-MDA	Brasilia
9th August	Ervandra Timm	SDT/MDA	Brasilia
27th July	Marcos Antonio	Mins Planejamento e Invetimento-Encargado Relacion con MAPA	Brasilia
18th August	Raul	Coord Politicas Publicas-ISA	Brasilia
12th August	Tatiana de Carvalho	Analista de Programa de Conservacion Senior-WWF	Brasilia
12th August	Anaximandro Doudemet Almeida	Assesor Tecnico-CNA	Brasilia
12th August	Friend of Anaximandro	Assesor Tecnico-CNA	Brasilia
27th July	Jonh Landers	Tropical Zero Tillage Specialist	Brasilia
27th July	Policy makers from CONTAG- Paulo Polessi; Moacir Chaves; Decio Sieb; Elisiario Toledo	CONTAG	Brasilia
1st September	Daniela Mariuzzo	Rabobank	São Paulo

STAGE 2 INTERVIEWS - February-August 2010			
Date	**Name**	**Title/institution**	**Location**
30th June	João Shimada	Corporate Environment Supervisor, Grupo André Maggie	Cuiabá
5th July	Neldo Egon Weirich	Sec Agricultura MT	Cuiabá
6th July	Karin Kaechele	ICV	Cuiabá
6th July	Camila	ICV	Cuiabá
23-24th August	Americo - Joao Leon - Joaquim Francisco Ferreira	INCRA-Barra do Garcas	Barra do Garcas
24th August	Cristiane	SEMA	Barra do Garcas
24th August	Dalmir Comiran	IBAMA	Barra do Garcas
24th August	Marcelo Cabral De Aguiar	IBAMA	Barra do Garcas
30th June	Luis Carlos F. Bernardes - Conocido Niuza Amaral - Coop Querência	SEDER - Sec Agricultura MT	Cuiabá
7th June	Julio Cesar Bachega	Sec Adjunto de Mudancas Climaticas - SEMA	Cuiabá
29th June	Luiz Nery Ribas	APROSOJA, Technical Manager	Cuiabá
23rd April	Glauber Silveira da Silva	APROSOJA, President	Querência
6th July	Antonio Fatimo	Fetragri- Secretary of Social Policy	Cuiabá
10th June	Sol Angel	FOMAD	Cuiabá
10th June	Maria Emilia Lisboa Pacheco	FASE-ANA	Cuiabá
1st July	Jacir	CONAB	Cuiabá
11th July	Edson Joaquim de Souza	Member of Agroecological Association in LRS-Querência	Cuiabá
4th May	Alcides Jose Salamoni	Coopercana	Agua Boa
26th June	Pedro Ross	Coopercana	Cuiabá
4th May	Edio Schwantes	Coopercana	Xavantina
4th May	Gilmar Bonfanti	Researcher	Xavantina
4th May	Lucia and Ricardo	Family Farmers	Agua Boa
1st February	Marcos da Rosa	Pres Sind Rural	Canarana
1st February	Olmar Goldon	Pres Sindicato Trabalhadores Ruraes-Canarana	Canarana
1st February	Rodrigo Ferer	Agronomo - APROSOJA	Canarana/ Querência
6th May	Augusto Dunk	Prod-Coopercana	Canarana
8th June	Rodrigo Junqueira	ISA	Canarana
8th June	Eduardo Malta Campos Filho	ISA	Canarana
9th June	Ericka Lobato	FASE	San Felix de Araguaia
9th June	Abilio Vinicius Barbosa	ANSA	San Felix de Araguaia
9th June	Galo	Pres. Sindicato Trab Rurales-Vila Rica	Vila Rica

Interviews in Querência – 2010		
Date	**Name**	**Title/ institution**
25th March	Denir Perin	Prefeito 1992-96
March	Five municipal deputies	Vereadores 2008-2011
13th May	Daltro	Sec Agricultura Querência since 1996
11th February	Juvino Gomes (1936-)	Ex-vereador
19th February	Helio Vitorino Silva	Former municipal mayor (1992-2000), also former accountant of COOPERCANA in Querência
20th May Condominio	Neuri Wink	Vereador/Producer/ Associacão Prod
8th Feb, 27th April, 2nd June	Eleandro Mariani Ribeiro	Pres Sindicato Trabalhadores and Trabalhadoras Ruraes- Querência
8th February	Vera and Claudia	Secretarias Sindicato Trabalhiadores Ruraes- Querência
4th May; 18th February	Milton Eichholz	Agroecologist, advisor to the Municipal Secretary of Agriculture
18th February	Gerda Eichholz	Teacher. Former director of Rural School in Querência
5th May	Genesio de Costa	Small-scale producer,
4th March (2nd)	Ferracini	Pres. Associacão LRS
4th March	Aldo	Pres. Associacão Prouctores Estrela da Paz - Agroecological
18th February	Luciano Langmantel Eichholz	ISA
29th January	Darci Heemann	Pres Sindicato Rural ?-2010
29th January	Junior Fasolo	Sind Rural
29th January	Marcelo da Cunha Marinho	Finanzas Sind. Rural
29th January	Gilmar Dello'Osbell	Pres Sindicato Rural 2010-
9th May	Gilmar Burnier	Producer, owner of silo
6th June	Darci Tossati	Soybean Producer
21st February	Anonymous	Administrative Worker Fzd. Roncador
21st February	Anonymous	Soybean producer - Plot next to LRS, mix cerrado and forest management
12th June	Evandro Moraês	Cargill-Querência, Manager
12th June	Leo	ADM-Querência, Manager
12th June	Darcy Ferreira Lima	Louis Dreyfus-Querência, Manager
12th June	Julio Cezar Franchini	EMBRAPA
7th June	Bruno Telles	Rural Querencia - agro-input provider
11th June	Carlos Teixeira	San Gabriel - agro-input provider, manager
11th June	Carlos (Carlao) Ten	Sin Agro - agro-input provider
11th June	Agriculture technician	Empaer
9th May	Adao Lari Caumo	Agronomist, and Co-owner of technical assistance company Plantagro Ltda
8th February	Joely	Agro Technician from APROSOJA
20th May	Irio J. Guisolphi	Co-owner of technical assistance company Plantagro Ltda
20th May	Milton Vianei Weber	Agriculture Technical Assistant- Condominio
20th May	Anonymous	Owner of Supermarket in Querência
20th May	Genesio and Evanir Falabretti	Small-scale producers-owners of hotel
23rd May	Small-scale farmers in LRS	Farmers and shop owners

Interviews in Querência – 2010		
Date	**Name**	**Title/ institution**
6th June	Daniel Saggin	Ex-vereador
6th June	Arlet Becker Stulp	SICREDI cooperative bank-Querência, Manager
6th June	Tadeu Tiago Weiler	Land broker for Querência Colonization Project

Events Attended - 2010			
Date	**Event**	**Notes**	**Location**
18th May	Rural Union members meeting		
17th June	Simposio Aliancas Socioambientais - Org. By Alianca da Terra	Presentations by ADM, Alianca da Terra, IFC, Grupo Amaggi, and other.	Cuiabá
10th August	SIMPOSIO DA SOJA	XXXI Reuniao de Pesquisa de Soja da Regiao Central do Brasil- Embrapa	Brasilia
9th-11th June	Foro da Agricultura Familiar e VI Encontro de Agroecologia	Family Farming Forum and VI Agroecology Encounter	Cuiabá
	Workshop Diamantino - RTRS		
15th-17th May	Workshop Villa Rica- with small-scale farmers	Organized by ICV and ANSA - Agroecological Network	Villa Rica-MT
21st May	Presentation of Research at the primary schools in Querência		Querência
13th February and 22nd February	Ruedas (rounds) de mate - chimarrao (13th with Querência's Mayor)	22nd presence of traders (afternoon)	Querência
31st January	Field test days - BASF, COODETEC and AgroSan Gabriel	observation and chats	Querência
06th February and 5th June	iLPF and reforestation-Two field days at Neuri Wink - Fzd Certeca	Seminars and visit to experimental fields	Querência
21st May	SinAgro/Syngenta/Fzd Alvorada		Querência
19th February	PSB political campaign in municipal chamber		Querência

Appendix II: Amaggi Group farms

Fazendas/Farms	Municipality	Biome	Area Property	Farmed Area	Area of Legal Reserve/ Permanent Preservation	Area of Legal Reserve/Permanent Preservation, Recuperation
Ponte de Pedra	Rondonópolis	Cerrado	3,460.50	3,460.50	-	-
SM1	Itiquira	Cerrado	2,448.88	2,339.12	106.02	3.74
SM6	Itiquira	Cerrado	2,129.69	660.53	1,469.00	0.16
SM2	Rondonópolis	Cerrado	1,179.98	1,027.04	144.19	87,435.00
SM4	Rondonópolis	Cerrado	783.16	632.02	145.43	57,161.00
SM3 A	Itiquira	Cerrado	1,592.71	1,467.50	124.28	0.92
SM3 B	Itiquira	Cerrado	7,858.65	7,583.93	268.10	6.61
Ponte de Pedra 2	Rondonópolis	Cerrado	4,491.60	2,497.03	1,973.94	20.63
Estancia Promissão	Campo Verde	Cerrado	120.47	120.47	-	-
Sapezal	Sapezal	Cerrado	10,284.75	7,933.33	2,345.20	6.22
Tucunare	Sapezal	Cerrado	44,472.43	35,472.28	8,969.67	304,811.00
Agua Quente	Sapezal	Cerrado	20,435.12	15,095.51	5,331.90	4.71
Juruena	Sapezal	Cerrado	491.75	314.91	176.83	-
Dois Corregos	Lucas do Rio Verde	Cerrado	2,370.60	1,406.46	935.33	28.81
Tanguro	Querência	Amazon	80,862.99	33,925.55	46,655.27	282.17
Agua Quente 2	Sapezal	Cerrado	1,260.30	-	1,260.30	-
Novo Santo Antonio	Nobres	Cerrado	1,200.00	-	1,200.00	-
Faunae Flora	Cocalinho	Cerrado	13,236.84	-	13,236.84	-
Encontro das Aguas		Pantanal	1,683.45	-	1,683.45	-
			200.363.87	113,939.20	86,025.76	398.90
Itamarati	Campo Novo dos Parecis		51,919.40	51,919.40	-	-

Source: (Grupo Amaggi 2010, 89)